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AMERICAN

DYESTUFF REPORTER

AL PUBLICATION
of the
ROCEEDINGS
AN ASSOCIATION
XTILE CHEMISTS
D COLORISTS

Distinction . . .

is reflected in Cotton and Rayon fabrics dyed with Solophenyl* colors such as Geigy's direct, faster-to-light . . .

SOLOPHENYL BLUE 10 GL

Level-dyeing in the extreme and an exceptionally soluble color, it yields bright, greenish shades of blue with excellent fastness to light. Suitable for self shades and well recommended for dyeing Union goods, it reserves Acetate and has good dischargeability.

Fabrics dyed with Solophenyl colors are distinctive — their light fastness make them so.

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PROVIDE SUPERIOR...LASTING SOFTNESS WITH DECERESOL 1861

DECERESOL* 1861 Softener is a durable type softener composed of surface active colloids and possessing a high degree of compatibility. At optimum concentrations it imparts superior softening with a soft, silky, but not raggy hand to woolens, cottons and rayons as well as to other yarns and threads. DECERESOL 1861 reduces bleeding of direct colors, decreases crocking of napthol colors and inhibits gas-fading tendencies of certain acetate colors. In warm water solutions, ordinary stirring produces good dispersion and stable suspension.

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- Compatible with gums, starches, acids, solvents, and dilute alkalies (less than 1% NaOH); also with sulfonated oils and casein solutions in proper ratios.
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- Retains softening properties after repeated washing, dry cleaning of fabric.
- Will not discolor white goods when specified concentrations are applied.
- Yields greater resistance to hot-iron scorching than many cationic softeners.
- Will not develop odors on goods. White goods will not retain chlorine after bleaching.
- Possesses wetting ability, normally making use of additional wetting agent unnecessary.

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American Cyanamid & Chemical Corporation

(A UNIT OF AMERICAN CYANAMID COMPANY)

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Analysis

Sodium Sulfide	60 to 62%
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Sodium Salts	2.0% Max.
Iron	8 ppm Max.
All Other Metal Salts	1 ppm Max.
Water of crystallization	36.5 to 34%
Shipping Containers	Drums 90 and 350 lbs. net.

SODIUM SULFHYDRATE, NaSH, a light yellow colored solid in flake form. Soluble in water and alcohol, insoluble in ether.

Analysis

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Sodium Sulfide	1 to 2%
Sodium Chloride	1% Max.
Other Sodium Salts	1% Max.
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All Other Metals	1 ppm Max.
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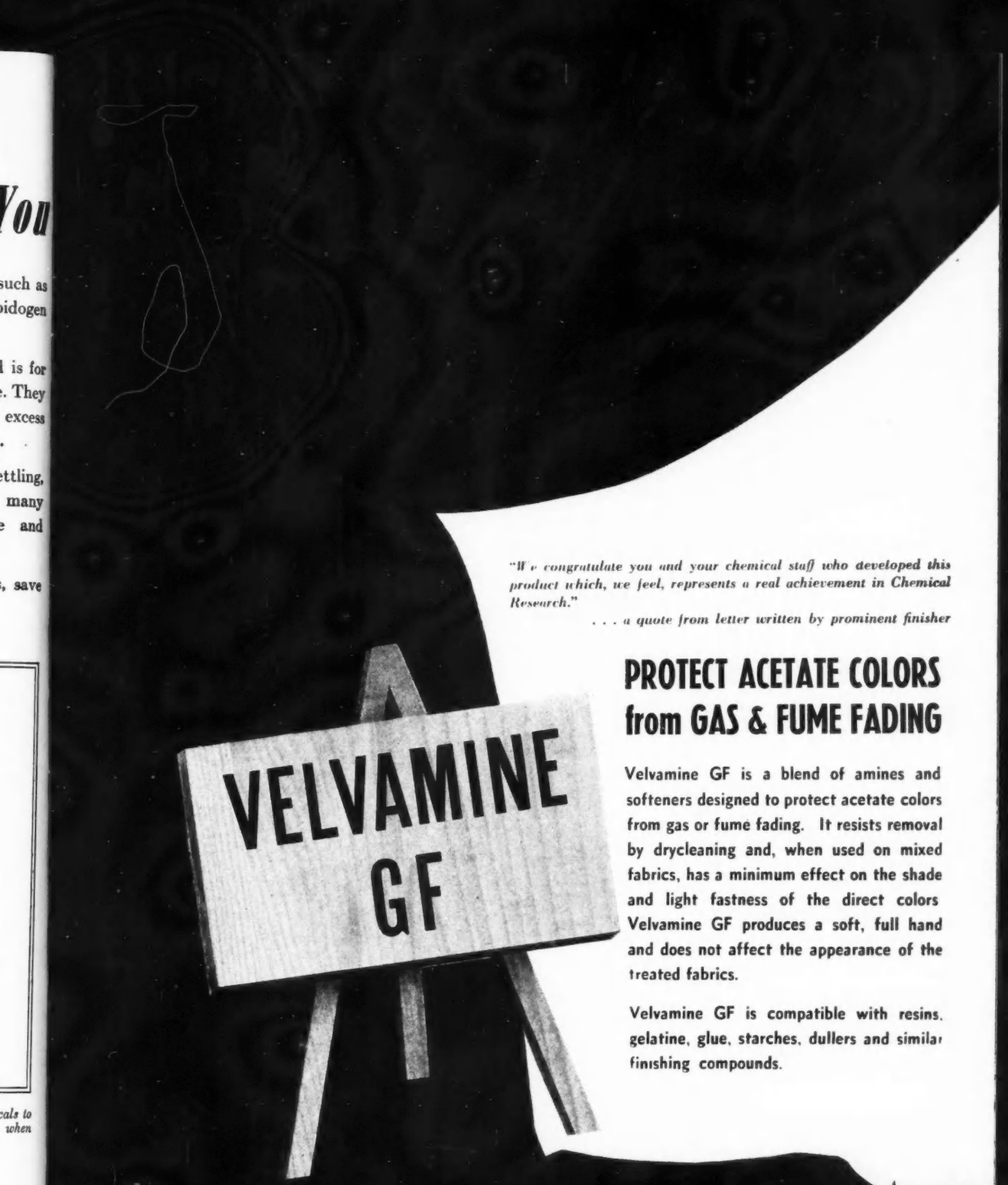

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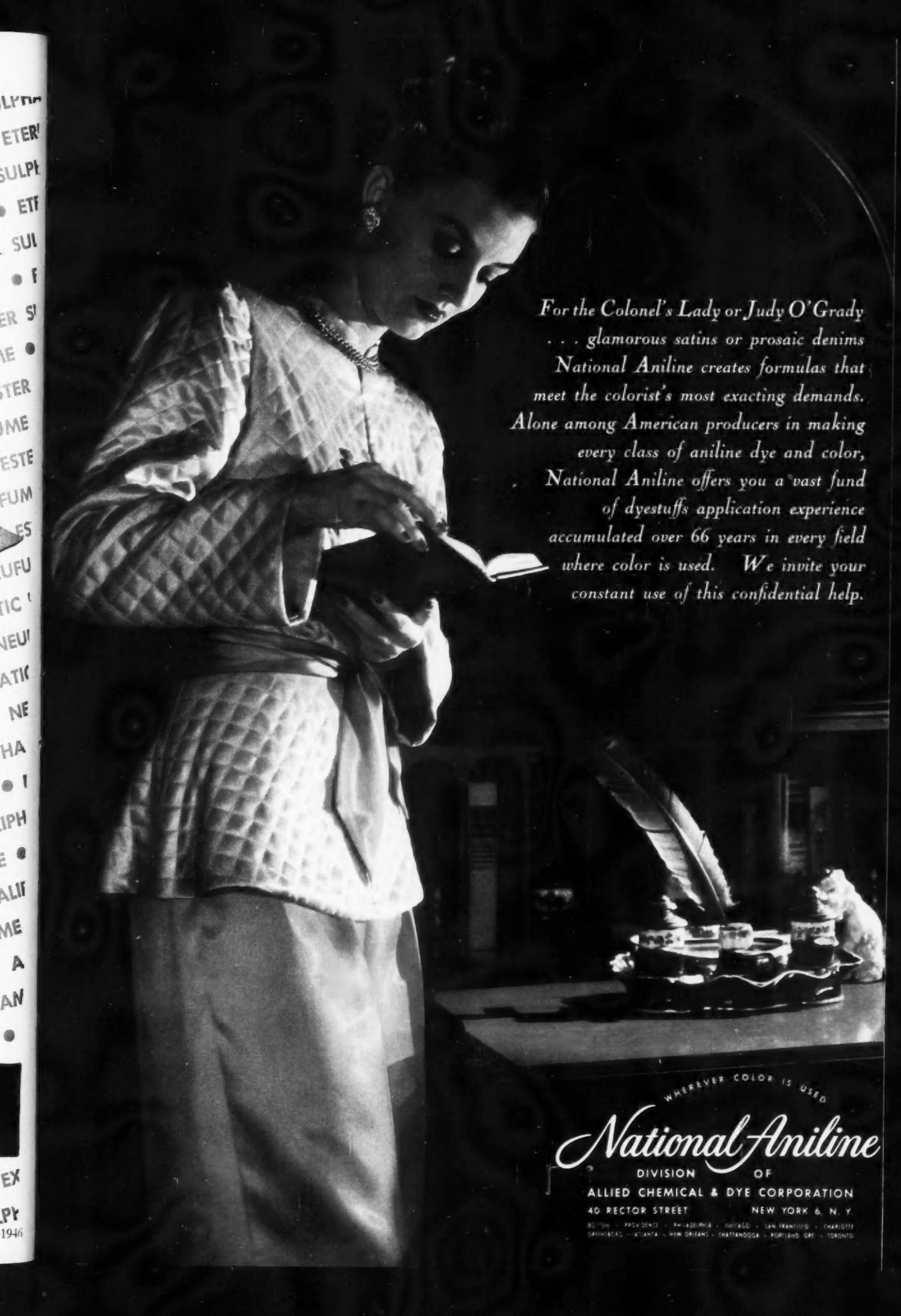
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20. Mary Retailer, dress buyer at [illegible] Department Store, receives a call from the Bureau of the Interior Department. After the [illegible] already been approved by [illegible] and helpful data containing material from the American Viscose Corporation.
Now!

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We Want You to Have It. If the manufacturing, buying or selling of rayon fabrics is your concern, write us for your free copy of "Life Story of a CROWN Tested Rayon fabric"... and do it today!

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1 Provide a velvety soft finish.

2 Do not affect shades of dyed fabrics.

3 Resistant to repeated washing and dry cleansing.

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AHCOVEL-E

—was originally developed for hard twisted fabrics where good draping qualities are normally difficult to obtain—such as hard twist acetates and nylons. It flexibilizes the fibres.

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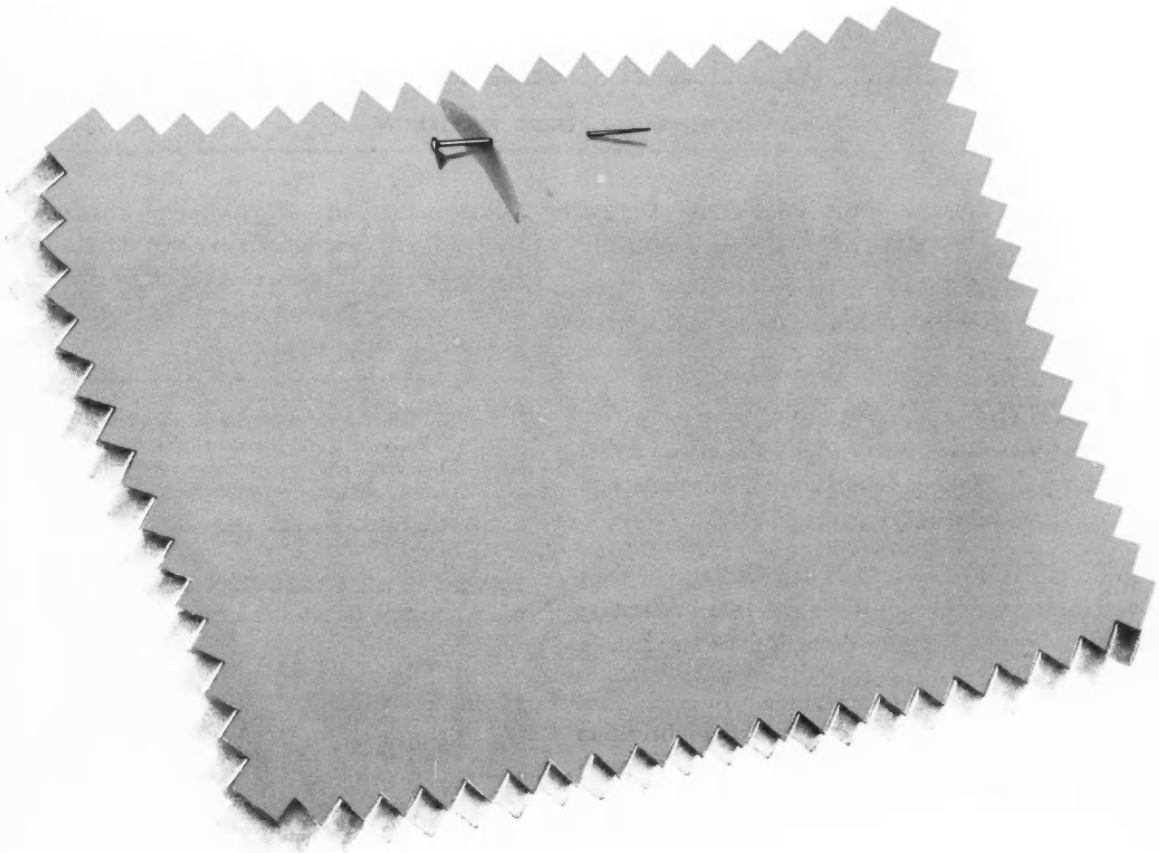

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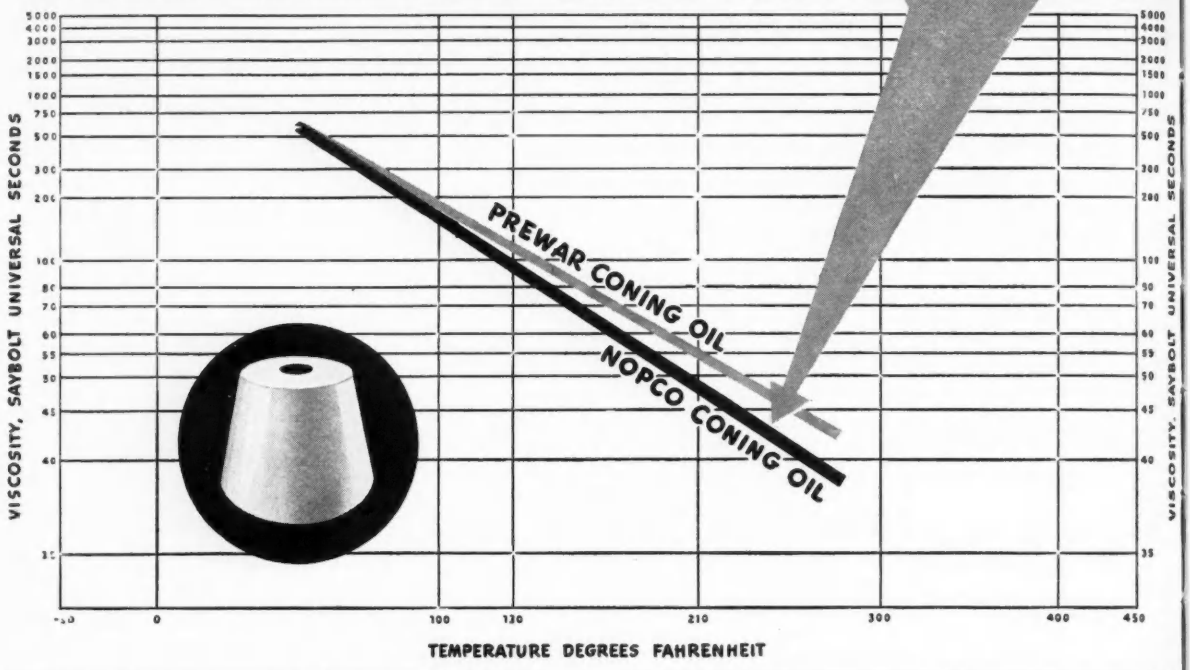

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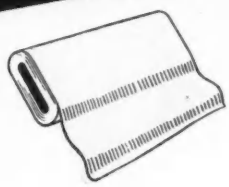
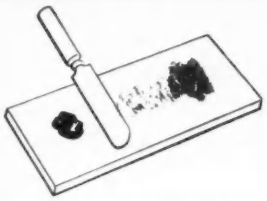


Textile Processing



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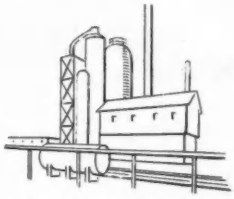

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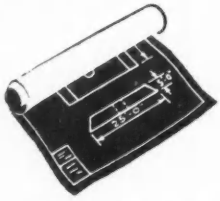

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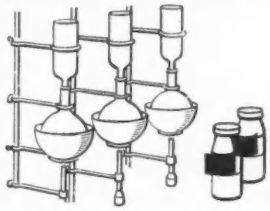

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3 ethanolamines...

Diethylethanolamine

$(C_2H_5)_2NC_2H_4OH$

...is used chiefly in the syntheses of antispasmodics, anti-malarials, and pain-relieving pharmaceuticals. Its fatty esters are of particular value as emulsifying agents for waxes and oils to be applied under acidic conditions, as in the case of textile waterproofing compounds. These oil-soluble esters can be used in inks and paints as surface-active materials and may have value as rust inhibitors in petroleum products.

Dimethylethanolamine

$(CH_3)_2NC_2H_4OH$

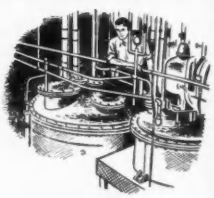
...is an intermediate in the synthesis of compounds used as corrosion inhibitors, anesthetics, acetate rayon dyestuffs, and textile auxiliaries and lubricants. Dimethylethanolamine forms highly surface-active esters which are well suited to cationic flotation processes. It is also valuable itself as a corrosion inhibitor in return condensate low-pressure steam systems.

Methyldiethanolamine

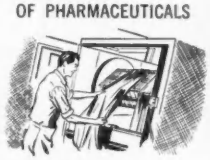
$CH_3N(C_2H_4OH)_2$

...is an intermediate in the manufacture of resins, pharmaceuticals, insecticide intermediates, emulsifying agents, and textile agents and dyestuffs. Methyldiethanolamine is a tertiary amine with two highly active hydroxyl groups and is a valuable product for the preparation of a wide variety of compounds.

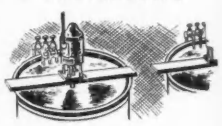
FOR MANY APPLICATIONS, INCLUDING . . .



MANUFACTURE OF PHARMACEUTICALS



MANUFACTURE OF TEXTILE ASSISTANTS



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Official Publication of the Proceedings of the American Association of Textile Chemists and Colorists

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Published every other Monday by
HOWES PUBLISHING COMPANY, INC.
One Madison Avenue, New York 10, N. Y.

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MARCH 11, 1946

VOLUME 35 NUMBER 5

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DEVELOPMENTS IN GERMANY

Victory Convention, Hotel Pennsylvania, New York City, January 4, 1946.

THE session convened at 2:30 o'clock, William D. Appel presiding.

Chairman Appel: You all know by now, I am sure, that there have been a good many observers sent into Germany to investigate various industries, including the textile industry, and that some of these observers have been coming back over the past several months. This afternoon's program is to give you first-hand reports from some of these observers. Some of them have been sent over by the Office of the Quartermaster General, others by the Technical Industrial Intelligence Committee of the Joint Chiefs of Staff.

Your past president, Thomas R. Smith, was to have presided here. He arrived from abroad only yesterday and is trying to do three or four things at once today. But he will be here later, when he will speak to you about his trip.

First of all I am going to call on the man who has been back of the textile observers and the various teams that have gone across from the beginning. He has been the moving spirit in the whole thing. Lt. Colonel S. J. Kennedy of the Office of the Quartermaster General is going to tell you something about the background of these trips and their purpose. I will now call on Colonel Kennedy. (Applause)

* * *

Colonel S. J. Kennedy: Little did I think a year ago when we first started work on this that we would find so much information of value to the textile industry. When we first started out a year ago, with the war still on, we were concerned primarily, with the other investigating agencies, as to what we could obtain that would help us in the carrying on of the war. We were concerned very greatly with problems of water repellency. We knew the Germans had done some work in that field because we found it in some of the garments we captured. So our early objectives were quite limited to things of direct concern to the military.

Later as the program developed and it became clear that we would find much information of value to the industry as well, information which would have a dollar and cents value to the manufacturers in this country, we attempted to cover as many different aspects of what the Germans had been doing as possible.

There were several reasons for that. In the first place, our allies would have the information, and while perhaps they don't look upon private enterprise in the same way we do, they would have the information and would be able to use it. So obviously we wanted to make sure that America had the benefit of it.

You have heard and read the reports of quite a few of the men who have come back, and you will hear quite a few more, because we are very anxious to give each man an opportunity to talk face to face to the men in his own branch of the industry, and answer questions. We feel that he as an individual is entitled to have such an opportunity in order that his competitors and friends in other allied lines can ask him any questions they want to, particularly since some of the reports cannot be published quickly and will take some time before the final release can be made. The reasons are quite clear for that. Facilities in Germany for the publication of these reports are limited. While we have succeeded in publishing quite a few over there, most of the reports that have come back have been in half-edited form. Those of you who have done any writing know that it is not fair to a man to put his name to a document which has not been edited and organized.

We are very fortunate that the final reports of two of the speakers today are available.

I feel that you in the industry are extremely fortunate that we who organized these missions were able to obtain so many men of such high qualifications for the job which was given to them. It has been extremely gratifying to us on the receiving end to see the fine jobs that have been done under extremely great difficulties in many cases.

Mr. Smith isn't here, but I will say for him now that he and the other men of his group, some of whom are still there, have been operating under conditions of great difficulty. The return of soldiers to this country has cut down the staff of the agencies over there to a point where it becomes extremely difficult to get around and do the kind of a job that has to be done. For my part I would like to pay a small tribute to the way these men have pitched in and taken all of the unpleasantness and difficulties which have come their way with a fine spirit, and the way they have come through with some information of great value to you.

I would like to say one word before the first speaker comes on today about the investigation of the German dyestuff industry. We had a special problem of our own in that field which we wanted investigated, and we asked to have two men from the industry sent over. Two men were nominated, Dr. Miles Dahlen and Dr. M. L. Crossley. In addition to the work we gave them to do, they undertook a broader survey of the German dyestuff industry, about which you will hear, and obtained a great deal of information. I would like to stress that what they brought back is not by any means all the Germans know which might be of interest to us.

Just within the last two or three days I received word from our Intelligence Branch that the shipment of the copies of Dr. Dahlen's report, which were reproduced in Frankfurt, arrived in this country, and I have arranged already to have them made available through the usual channels. The usual channels for release of all information pertaining to war investigations or captured enemy information is that the initiating agency will turn the information over to the Department of Commerce, where there has been set up an office known as the Office of Publication Board, the Publication Board consisting of representatives of various government departments, but located in the Department of Commerce.

The Office of Publication Board then makes these reports available at a nominal cost to anybody who writes and asks for them.

So I would like to make it clear that the reports which will be discussed here today will ultimately be available through those channels. But immediately the report of Dr. Dahlen will be so available.

It is a great deal of pleasure to be able to present to you as the first speaker Dr. Miles A. Dahlen, of the duPont Company.

* * *

Dr. Miles A. Dahlen: Colonel Kennedy, Mr. Appel, Ladies and Gentlemen: I could read the report that just came back which

Colonel Kennedy referred to, but I think it would be a little bit too long. However, I am going to do something I never did before, and that is to read my present paper. Having had the privilege of going over there and having talked since, I realize that if I started talking extemporaneously I would talk a long, long time.

. . . Thereupon Dr. Dahlen presented his prepared paper . . .

* * *

DYESTUFF DEVELOPMENTS IN GERMANY DURING WORLD WAR II

MILES A. DAHLEN

E. I. du Pont de Nemours & Co.

IN the middle of July, Dr. M. L. Crossley and I proceeded to Germany as consultants for the Office of the Quartermaster General. We were to constitute two new members of the Textile Team of O.C.Q.M. Consultants, but because of delays, we arrived in Frankfurt shortly before the return of that team to this country. Many of you have heard or read the reports on the textile industry made by the members of this Textile Team.

Since the war with Japan was still in progress, Dr. Crossley and I were interested primarily in new dyestuffs and color application processes which could be used in the war in the Pacific. Certain military problems were involved in our work, and the report on these problems cannot be made public at the present time. However, it is self-evident that any new dyestuffs or new methods of color application which could find use in military products are of equally great interest for our production of civilian products. Likewise, any new dyestuff developments of civilian interest might find military use. Hence, we set out to learn all we could about all new dyestuff developments. It is on this portion of the investigations of Dr. Crossley and myself that I am reporting today.

The Textile Team concentrated its investigations on textile mill practices and related activities. We were to be the chmeists of that group and therefore concentrated our investigations in the chemical organizations developing and producing dyestuffs and studying their physical, chemical and application properties. In Germany, this meant, of course, an investigation of the dyestuff divisions of the I. G. Farbenindustrie. We also made a trip to Italy to consult the dyestuff branch of the Montecatini organization. We also spent some time in the U. S. Army Document Center at Heidelberg studying I. G. records, and we interviewed other technical men in Germany familiar with dyestuff practices. We also came across a few interesting technical subjects more or less by accident, and I shall mention these briefly in this report.

I. G. dyestuff research, development and manufacture has been concentrated at the following points:

1. Ludwigshafen, now in the French zone of occupation. This plant, largely destroyed, was the main vat color plant, with many other dyestuff and auxiliary activities. This was the main unit of the Badische organization prior to the formation of the I. G.

2. Leverkusen, now in the British zone of occupation. This plant produces a variety of dyestuffs, with particular emphasis on the azo class. It also has been the most important point for research on dyes and application processes. It was the chief dyestuff unit of the Bayer organization prior to the formation of the I. G.

3. Hochst. This plant, formerly the chief unit of Meister Lucius and Bruning ("MLB"), located in a western suburb of Frankfurt (American Zone), manufactured several classes of dyestuffs, numerous auxiliaries, and some pharmaceutical products. Here also, a large research organization was devoted to dyestuffs.

4. Mainkur. This plant, located in an eastern suburb of Frankfurt, specialized in sulfur colors and was previously the chief unit of Cassella.

5. Offenbach, located in another suburb of Frankfurt, specialized in Naphthol products. It was formerly the chief dyestuff unit of Griesheim.

6. Uerdingen, a smaller plant in the British zone, produced certain intermediates and pigments.

7. Elberfeld, also in the British zone, is primarily a pharmaceutical plant and originally was the Bayer headquarters. It was of interest to us because the determination of toxicological properties of dyestuffs and auxiliaries was carried out in the Elberfeld laboratories.

At this point I should like to digress to correct an erroneous impression which apparently is rather widespread. Because some 55 percent of all I. G. plants and properties are located in the Russian zone and only about 11 percent in the American, it has been assumed that the United States has fared rather badly in the division of the I. G. While, in general, this may be true; insofar as dyestuffs are concerned, all the important plants other than the Wolfen plant are located in the British, French and American zones. Furthermore, Wolfen is primarily a manufacturing unit with little research and development in the dyestuff field. The Hochst, Mainkur and Offenbach plants and laboratories, all in the American zone, represent at least one-third of the I. G. dyestuff activities; and we had ready access to the units in the British and French zones.

Obviously, it was impossible for Dr. Crossley and myself to cover all the dyestuff activities of the I. G. in three months' time. We, therefore, restricted our work largely to a special military problem not reported here, to learning all we could about new dyestuffs produced in the war period, to securing all new information on dyestuff application from the more chemical and technical points of view, and to such other subjects as would be of particular interest to chemists in this field. The subject of color application from the mill man's point of view had been covered in part by the Textile Team; and an additional team of specialists in this field, working under the T.I.I.C. organization, was coming to Germany to continue the work in greater detail.

At each major point of dyestuff research and manufacture, the I. G. technical personnel were asked to supply full information on each dyestuff developed since January 1, 1939. This date was selected in order to cover all products developed during the World War II period. We requested the constitution of each dyestuff and the necessary intermediates, manufacturing processes, detailed information as to application properties, and substantial samples. In general, the response to our requests was very good on the part of the I. G. personnel. In some instances we obtained only the constitutions of the new dyestuffs, in other instances process information was obtained only in part, but in many cases our entire request was fulfilled. Where we failed to secure all the desired data and samples, the explanation usually given was that war damage had destroyed records and samples, necessary processes and reports were missing and their location was unknown, or the technical personnel familiar with the subject were not available. In general, it was our impression that these explanations were truthful.

Data as outlined above were obtained on 119 dyestuffs and pigments from I. G. and 3 from the A.C.N.A. Division of the Montecatini organization in Italy. It should be stated at this point that many of the new dyestuffs from I. G. probably were known in the United States, since the United States did not enter the war until December, 1941. However, Dr. Crossley and I had no way of knowing how much technical information had been transmitted to the United States on products developed in 1939-1941, and for this reason we secured all possible details. Obviously, we had no information as to I. G. policies with respect to transmitting to subsidiaries and associates abroad technical information usually jealously guarded in Germany. Under the Nazi regime, we suspected that they might have withheld everything of value not absolutely necessary to their foreign associates.

I shall not bore you with a detailed list of the dyestuffs and the technical information gathered relative to them. It is all contained in our rather voluminous report which should be available in the near future for distribution to those interested. This report is entitled "The Development of New Dyes and Color Application Processes in Germany and Italy During World War II," and will be released through the usual government channels. However, I will mention a few items which may be of general interest.

A line of 19 dyestuffs for Perlon, the I. G. polyamide fiber closely related to nylon, had been developed at Ludwigshafen. Five of these are typical dyestuffs for acetate of the anthraquinone series, renamed as "Perlonecht" or "Perlon Fast" dyes. Thirteen are metallized azo dyestuffs, all soluble in water. The nineteenth is a mixture. The methods of metallization of the azo dyes are rather unusual in that solubility in alkalies of the finished dyestuffs is achieved. In some cases, this solubility is enhanced by the presence of sulfonamide groups.

As many of you know, there is a need for new dyestuffs for nylon of improved light and wash fastness. So far, such colors have been found only among the acid, chrome and premetallized types, all of which accentuate fiber differences to an undesirable degree.

The I. G. have had relatively little experience with variations in dyestuff substantivity on Perlon due to differences in fiber orientation, the so-called "draw ratio," etc.; and, they had done little work with the American type of nylon. They were not able to predict accurately the behavior of these new dyestuffs in covering up fiber variations. However, they did claim improved fastness over the acetate class when applied to Perlon. We expect there will be considerable interest in these new dyestuffs in the United States.

Emphasizing the I. G. interest in new dyes for synthetic fibers, a group of six new water-soluble dyestuffs for acetate also had been developed in the laboratories at Ludwigshafen. The group includes a yellow, scarlet, red, rubine, violet and brown, and the line was completed by inclusion of an old acetate blue.

Also in the field of dyes for synthetic fibers, nine special colors for "PeCe" fiber were developed. These are similar to dyestuffs for acetate and may find some use on this fiber or on polyvinyl fibers manufactured in the United States. As previously reported, "PeCe" fiber is chlorinated polyvinyl chloride, a very cheap German synthetic not manufactured in this country.

Much has been said by previous investigators concerning the importance of viscose and cuprammonium staple in Germany because of lack of cotton and wool. Emphasizing this situation, four new blacks and a navy blue, known as "Autazols," were developed for use on rayon-wool unions. These azo dyestuffs are applied from an ammonium sulfate-Glauber's salt bath, then after-treated by diazotization and self-coupling followed by chroming. Excellent fastness properties are claimed for these colors, but the application process seems too lengthy for American practice.

The Textile Team reported considerable mill interest in the 'Astrazones," a group of dyestuffs developed especially for printing acetate. Brilliant shades of moderate fastness are obtainable with these colors. We secured considerable application data as well as the constitution and certain manufacturing data relative to these colors. Small samples also were procured. They appear to be specialties relatively expensive to manufacture, but may find limited use here.

In addition to the above, numerous other colors of the well-known types were disclosed to us, including dyestuffs of the vat, direct, developed, acid and pigment classes. The three new colors found at A.C.N.A. in Italy were all vat dyes for wool of the 'Helindone" type.

The 119 new I. G. colors listed in our report appear, on superficial examination, to be a very impressive addition to existing lines of dyestuffs. However, some of the products undoubtedly are I. G. duplications of relatively recent competitive types. But more important to those of us concerned with the chemistry of dyes is the fact that practically all of them are logical modifications and extensions of known classes of dyes.

We found no new chromophores nor any very startling individual products, in a chemical sense.

In other words, the I. G. had a large staff of research workers and therefore was able to conduct a large program of development; but the main result of this effort was the routine development of rather orthodox new colors. Brilliant ideas leading to startlingly different new dyes seemed conspicuous by their absence.

We came away from our studies in the I. G. laboratories with the happy feeling that our American research workers in the dyestuff field certainly do not suffer by comparison with their I. G. contemporaries. In fact we often expressed the opinion that on the average our research people must be two or three times as productive on a man-for-man basis as the I. G. group.

From a "quality" joint of view, we also felt that American research is superior and this applied likewise to control of quality and uniformity of the final products in manufacture.

As to new developments in color application, it must be said that there was far less interest in Germany than is current in the United States at the present time. However, I shall mention a few subjects on which more complete reports are expected from the team now completing its studies in Germany.

PIGMENT PRINTING AND DYEING

Interest in this field has been created primarily by developments in the United States and most of the work in Germany, as well as in Italy, has consisted of duplication of American products.

The chief interest, however, has been in the direction of aqueous emulsions of the oil-in-water type, using interpolymers as the bonding agents. One bonding agent which has proved of interest is a mixture of a urea-formaldehyde condensate with an interpolymer of vinyl acetate and butyl acrylate. We found nothing which had reached the commercial stage.

DYEING CELLULOSE ACETATE

The Ludwigshafen personnel made a concerted effort to develop dyeing processes for cellulose acetate utilizing water soluble dyestuffs instead of the customary dispersed colors. They stated that considerable difficulty has been encountered in Germany in dyeing some acetate fabrics, due to poor penetration by dispersed colors. The new colors for acetate mentioned previously were developed in connection with this investigation.

APPLICATION OF "ANTHRASOLS"

The sulfuric acid esters of leuco vat dyes, the so-called "Soluble Vats," are known in Germany as the 'Anthrasols." As is well-known, many of these colors

may be adversely affected in the usual nitrous acid oxidation, due to over-oxidation. Various materials have been recommended to inhibit this action. In October, 1942, the I. G. placed "Anthrasol Salt NO" on the market, claiming it to be superior to agents previously used for this purpose. The product chemically is thiourea, a rather common auxiliary in certain other color application processes. It is typical of the I. G. to place a trade name on a relatively simple chemical compound, rather than to recommend the use of the compound as an assistant in coloration processes.

APPLICATION OF VAT DYES

New methods for the continuous application of vat dyes are currently of great interest in the United States. We, therefore, were especially interested in an I. G. dvelopment which has been in progress for several years. It is known to them as the "Küpensäure Verfahren," that is, the "vat acid" procedure. It is an outgrowth of previous work they had carried out on the application of vat dyes under unusually low pH conditions.

The various processes utilizing the vat acid principle begin by reducing the usual vat dyestuff with a minimum quantity of hydrosulfite and caustic at high concentration. This vat then is added to a dyebath or padding bath along with acetic acid and a suitable dispersing agent. The leuco form of the dyestuff is precipitated in a highly dispersed non-substantive form. Yarns and piece goods can be dyed with this dispersion, the color being exhausted and fixed by gradual addition of caustic soda and hydro. Since none of the vat acids are substantive, but they are all converted to the normal substantive alkali-soluble leucos by the addition of caustic and hydro, good control of rate of dyeing is achieved. Differences in substantivity of the usual leucos of vat dyes are minimized by this procedure, making easier the selection of components of mixtures.

As an illustration of this idea, piece goods are padded with the vat acid dispersion, then developed on the jig by gradual addition of caustic soda and hydro. It is claimed that this procedure has the following advantages over the customary pigment pad-jig development method:

1. More uniform color distribution and absence of specks.

2. Lower consumption of auxiliary agents.

3. More rapid development on the jig, due to the fact that transformation of the vat acid to the normal leuco takes place more rapidly than reduction and fixation of pigment padded piece goods.

As a logical extension of the preceding process, piece goods have been padded experimentally with the vat acids, dried on a hot flue or tenter under non-migrating conditions, then padded with caustic soda and hydrosulfite and developed at high temperatures. For the development, we were told that the "Electrofixierer" was used.

This developing unit utilizes electrically produced radiant heat, and we were told that temperatures as high as 180°C. had been used. It was claimed that this procedure yields dyeings of excellent appearance and fastness, and that the rate of production can be very high. The relation of this development to current new methods under study in the United States will be apparent to those engaged in continuous dyeing of piece goods with vat colors. We did not have an opportunity to visit the mill where this procedure was operated experimentally, nor did we see the technical men most closely associated with the work. However, the T.I.I.C. Textile Team expected to study the subject more thoroughly and their report is awaited with much interest.

Other application subjects of some interest which are discussed in our report are the following:

1. The use of vat dyestuffs on cotton-wool union yarns.

2. The use of pre-reduced sulfur colors known as the Immedialsols.

3. The use of naphthol colors on Woolstra yarn.

Before leaving the topic of dyestuff application, I wish to mention one other subject in which we were interested and concerning which we asked many questions in Germany and Italy, but on which we arrived at no final answer. In the United States, it is customary to use chrome colors for maximum fastness on many classes of woolen materials. In Germany and elsewhere on the continent, a special group of vat dyes for wool, known under the trade name of "Helindones," is used extensively. As far as we could determine, the "Helindones" are much more expensive than the chrome colors, produce about the same range of shades, and when applied to rawstock result in improved spinning properties. There seemed to be considerable controversy as to whether woolen garments dyed with the "Helindones" were more or less durable than those dyed with chrome colors. Of course, an important factor leading to the use of the "Helindones" was the extreme shortage of chromium during the war period. However, the use of the "Helindones" antedates this shortage, and, therefore, there must be some substance to the claims for better properties of woolens dyed with these colors.

As an example, however, of contradictory evidence and claims, the Luftwaffe carried out comparative field trials of garments dyed with chrome and "Helindone" colors. Their conclusions were in favor of the chrome colors. However, one of the I. G. experts claimed that the faster deterioration of the "Helindone"-dyed wool fabrics was due to bacterial and other attack and not to normal wear. He insisted that the chromium remaining in the chrome-dyed fabrics acted as an inhibitor of such attack. He also predicted that in the presence of a little chromium salt or other anti-bacterial agent the "Helindone"-dyed fabrics would have shown better wearing properties than the chrome-dyed fabrics.

Obviously, in such a situation, the American industry must make its own decision as to the relative merits of the two classes of colors.

In Italy, we found absolutely nothing new in the line of dyestuff application. We did learn that A.C.N.A. has turned out a remarkable line of color cards, artistic and practical, and they have high hopes of securing considerable export business. It seemed rather surprising to us that they could have spent so much effort along post-war promotional lines during the German occupation of North Italy.

An interesting item which came to our attention quite by accident is a new screen printing method. A sergeant in the Engineers had heard about it from a girl in General Donovan's O.S.S., and he looked us up to be sure that someone familiar with textiles would obtain the story. He, himself, as well as the girl in the O.S.S., were interested chiefly in military maps; and this new method is sufficiently accurate and produces sharp enough detail to be used for map reproduction.

An extremely fine metal screen is coated with a water-soluble resin and a polymerization catalyst activated by light. The coated screen is exposed under an arc light, using the pattern on translucent material much in the way that a photographic negative is used. This results in polymerization of the resin where exposed to light. Then a washing removes the resin where not polymerized, leaving the screen pattern. The actual color application with the screen is conventional except for an ingenious method of securing accurate register when several screens are used for a multi-color pattern. A simple oxidation with permanganate removes the resin stencil from the screen, and the latter can be reused. A report by Dr. Crossley discloses the information we secured on this process.

We were very much interested to learn

as much as possible about the organization of I. G. research and development in the dyestuff field, and obviously it was a part of our work to bring back any information about their methods which might be of value to the American industry. A few general observations may be of interest:

The I. G. employed approximately 800 research chemists in the field of dyestuffs and intermediates. To our surprise, we were told that not more than approximately 5 percent of these research workers were engaged in studies of color application and properties of dyestuffs. The remainder were engaged chiefly in the synthesis of new dyes and intermediates, the development of manufacturing processes, and improvement of existing products and processes. To us, this appeared to be a rather poor balance in effort; and this same opinion was expressed by more than one I. G. man in the course of various interviews. The policy of concentrating on new products with little emphasis on application was ascribed chiefly to the fact that most of their executives formulating policies were organic chemists and, therefore, primarily interested in purely chemical development of new dyestuffs and intermediates. Furthermore, they were extremely aggressive in developing new products, especially those which could be protected by patents; and which, through their sale, would result in a direct monetary return to the organization. They were nowhere near as enthusiastic about expending efforts to develop better application processes for their customers, especially in view of the fact that such processes might result in lowered dyestuff requirements. On the other hand, the organization did do a very thorough job of determining the properties of their colors; and they were especially capable in developing trade literature and handbooks for consumers. Here again, however, it was obvious that one of the important motives was the sales promotion of all their own products, including both dyestuffs and auxiliaries.

As to the caliber of their research personnel, it was our opinion that they were highly experienced but in general far from brilliant in new ideas. Their productivity insofar as new dyestuffs were concerned seemed to be due more to mass effort than to individual brilliance.

Another observation of interest to us was the fact that lengthy processes involving considerable labor were not particularly important problems to them. They normally had an abundance of intelligent workers, paid at so much lower a rate per hour than prevails in this country that they could afford to do many things which would be economically impossible here. Perhaps we shall find that some of the specialties imported pre-war from Germany cannot be produced in the United States at the pre-war selling prices, due to our higher labor costs. We also were surprised to find that their equipment in both laboratories and dyestuff plants was far from modern by American standards. Evidently their low labor cost made it advantageous to spend money on operating labor rather than to make extensive investments in modernized equipment.

It was the opinion of Dr. Crossley and myself that if many of the I. G. dyestuff manufacturing plants were transferred to the United States and operated with American labor at American rates of compensation, it would be impossible to manufacture many products at a profit at current American selling prices.

A few other items of interest are covered by our reports and I shall mention them briefly here:

The Elberfeld laboratories were visited to determine the extent of testing of chemical products for toxicological properties prior to offering them to the consumer market. We found that their tests were far less extensive than are normally considered necessary in this country. This was especially surprising in view of the very large biological laboratories of the I. G. and their extensive pharmaceutical business. An outline of their test procedure is contained in one of our reports.

Many of you have heard the report of the Quartermaster Textile Team relative to the Zellwolle Lehrspinnerei at Denkendorf. I visited this excellent establishment and was particularly interested in the fact that it was a point at which experimental fabrics could be produced in short yardages at relatively low cost. One of the difficult problems in connection with dyestuff application studies is the procurement of special fabrics, particularly suitable for many studies. This is especially true of mixed-fiber fabrics needed for labortory studies but not of a type suitable for consumer use. It is our hope that sooner or later similar facilities will be available in the United States or that some arrangement can be made whereby special fabrics can be produced for us for such studies at Denkendorf.

While visiting Montecatini in Italy, another development unrelated to our mission but of considerable interest was disclosed. Very pure hydrogen peroxide in high concentration is being manufactured electrochemically by Montecatini. After extensive laboratory studies in Italian Universities and elsewhere, they have determined that the material is pure enough for addition to milk. The idea of sterilizing milk with hydrogen peroxide is old; but to our knowledge, this is the first time that it has been put into practice. Usually the presence of heavy metals, instability of commercial hydrogen peroxide, and other factors have prevented its use.

All the milk in the Milan area and certain other sections of Italy is now sterilized by this method rather than by pasteurization, and we were told that the practice would be extended when production facilities for the pure hydrogen peroxide could be expanded. Even more interesting was the fact that they have prepared experimentally the solid compound of hydrogen peroxide and urea, and this is now under investigation for the same purpose with promising results. They hope to manufacture the material in tablet form, selling these tablets to primary producers of milk. A tablet of one size would be added to 25 kilograms of milk, a tablet of another size to 100 kilograms, etc. About 8 hours are required for the sterilization effect, but more than this time usually is required for distribution of the milk to the ultimate consumer. We hope our report will be considered seriously here, since if the development is sound, it offers an opportunity for safe milk in small communities where pasteurization facilities are not available.

Dr. Crossley is particularly interested in pharmaceuticals and related organic chemical products. He secured the latest data on mothproofing agents, including the four Eulans developed to practical use in Germany. He also learned that tetranitro-carbazol has been manufactured in large quantities as a plant insecticide, being substituted particularly for arsenates. This development is particularly interesting from the dyestuff industry's point of view, since the quantities of carbazol used for this purpose were so great that anthracene and not carbazol has been in excess in recent years in Germany. As some of you may know, in coal tar distillation anthracene and carbazol are produced in the same fraction and must be separated. Anthracene is converted to anthraquinone for vat dyestuffs and carbazol usually has been produced far in excess of requirements. As a result, most of the anthraquinone for vat colors used in the United States has been produced synthetically rather than from coal tar anthracene. It will be interesting to observe whether this tetranitro-carbazol development is sound and whether it will result in renewed interest in anthracene from coal tar.

It is the hope of Dr. Crossley and myself that at least some of the information we have secured in Germany will find use in the United States, either by duplication here or through stimulating interest in

the general ideas involved in German developments. At this point, however, I wish to say that we made no effort to determine the patent situation on any of the subjects in Germany. It would have been impossible to do this adequately because many of their records of this type are unavailable. For this reason, it is necessary for any organization interested in the information in our reports to take the responsibility for determining its right to utilize this information under existing American patents.

Our studies in the dyestuff field, as previously stated, were restricted largely to the war period. Even so, there is much additional information which we could not obtain. Furthermore, there is a great deal of other technical information in the I. G. on the manufacture and use of dyestuffs and intermediates which could be of considerable value to the American industry; but obviously two investigators could not in three months do more than sample this great store of information.

Nevertheless, the data we did obtain should be of very great monetary value. Those of us normally engaged in dyestuff development know only too well the many thousands of dollars usually expended to bring a single new color on the market. If only a few of the 120 or so colors discussed in our report prove to be new to the American industry and find a place in our market, we shall know that our work has yielded a handsome return.

In conclusion, I wish to express our sincere thanks to the War Department, and especially to the Office of the Quartermaster General for extending to us a real privilege in carrying out these investigations. Only once in a lifetime can one hope to enjoy such a rare and profitable experience. And particularly, we wish to thank Lieutenant Colonel S. J. Kennedy of the Military Planning Division in Washington and Lieutenant Colonel D. B. Dill, under whom we worked in Frankfurt, for their generous assistance in this work.

Chairman Appel: We are certainly indebted to Dr. Dahlen for his talk.

At this point I am going to call on Mr. William Lee, Chief of the Chemical Section of the Research and Development Division of the Office of Quartermaster General. He will tell you a little about the chemical side of these studies, and will also report to you a little of what Mr. Hoyt would have reported had he been here.

Mr. Lee!

* * *

William Lee: At the same time that Dr. Dahlen and Dr. Crossley visited Germany, three representatives of the Chemical Section, of the Office of the Quartermaster General, visited that country. They were: Raymond Pingree, of the Warwick Chemical Company; Lester Hoyt, of the National Aniline Division of the Allied Chemical & Dye Corporation; and Madison Sheely, of Armour & Company.

Mr. Pingree was particularly interested in problems of water repellency, water repellent chemicals and treatments; Mr. Sheely was interested primarily in soaps, in natural and synthetic fatty acids and in fatty acid derivatives; Mr. Hoyt in synthetic detergents. Mr. Hoyt had hoped until yesterday that he could be at this meeting, but he was unable to get here. I can't begin to tell you all of the things that Mr. Hoyt would have told about the German synthetic detergent industry. Perhaps I can summarize just a few of the generalities he would have made.

I think he would have pointed out that the Germany industry has been built on an economy of scarcity. Fatty acids have been scarce in Germany for many years before the beginning of World War II. As World War II progressed, this scarcity became increasingly acute, soap brands disappeared from the market, and standard soap products were rationed very strictly. Little by little, that ration was cut down. I cannot tell exactly how much was allowed per person per month, but it wasn't very many grams. Those few grams of soap were either built up with mineral fillers or blown up with large quantities of air. Some of the bars of German civilian soap feel like bits of rock; others feel like these modern synthetic foams that you can bounce around.

Germany's synthetic detergents did not present any outstanding developments that we haven't known about, but their rating of importance of items and their end uses have been considerably different. The most important detergents in Germany are sulfonated hydrocarbons of one sort or another. Chlorsulfonation processes were in use, employing both chlorsulfonic acid and sulfur dioxide with chlorine. Sulfonated amides were considerably used. There was very wide interest in the class of polyethylene glycol monoethers. Germany probably went further than we in making specific compounds of this class for particular processes; more particularly in the field of emulsifying agents. They built various monoethers with six ethylene glycol residues or eight or ten or twelve, depending upon the hydrophilic-hydrophobic balance they wanted to get. They apparently used a great deal of ingenuity and know-how in balancing the surface active agent to the job to be done. The polyethylene glycol detergents were also sulfonated.

There was little interest in the quaternary ammonium salt type of surface active agent. The Germans appeared to consider these were very high priced commodities which were just outside the German economy.

The distribution of surface active agents hasn't been as broad in Germany as it has been here. Far larger proportions went into textile scouring and textile conditioning. Fewer specialized detergents reached the retail market.

The Textile Team and the Chemical Team, by the way, worked together very closely, and made some of the same visits. Sometimes I have been uncertain as to who was where and who did specifically what, but I think it was Mr. Hoyt who, in talking to one of the I. G. Farben technologists, asked which, in his opinion, was the outstanding of the synthetic detergents. He was told, "Seife ist besser." (Laughter)

But for all that, the amount of synthetic detergents of one sort or another which is made over there is very considerable.

One of the very interesting things revealed by this visit, was the rapidly increasing use of carboxymethyl cellulose sodium salt as a detergent assistant. It appears to be generally considered that relatively small amounts of carboxymethyl cellulose—from wood cellulose—considerably improved whiteness retention in laundering. It is understood that I. G. Farben had, at one time, planned to augment very considerably the production of carboxymethyl cellulose for use as an adjunct in all sorts of surface active compositions. Samples of carboxymethyl cellulose—Tylose HBR and related products—were brought back by the team and are under test at the present time for various detergent uses.

These products are not anything like our American production of carboxymethyl cellulose, but are relatively impure products worked up by the simplest possible procedures and containing large quantities of by-product salt.

I cannot possibly go into detail on specific types of surface active agents as Mr. Hoyt would have done.

Mr. Raymond Pingree who, with Dr. Dahlen, studied the chemistry of water repellents, methods of application and related problems, will tell you about this very interesting field.

* * *

. . . Mr. Pingree's paper follows on the next page. . . .

Your RED CROSS
must carry on!

WATER-RESISTANT TREATMENTS

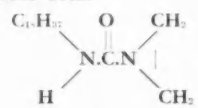
RAYMOND A. PINGREE
Warwick Chemical Co.

I WILL try to give you a picture of the trend of war time developments in water-resistant treatments for textiles in Germany. We found that the German textile situation had been quite different from ours and consequently their processing problems were of a somewhat different nature. Most German military textiles at the beginning of the war were made entirely from cotton. Their supplies of this fiber were soon exhausted, however, and for sometime after they were using blends of varying composition containing rayon and linen, with wool in diminishing quantity. Their supplies of virgin wool became depleted eventually and shoddy was then substituted. During the last months of the war practically all military fabrics were made from spun rayon with limited amounts of linen. It is common knowledge that one of the greatest failings of the rayon fiber lies in its high water absorptive properties and consequent reduction in strength in the wet state. German research efforts were therefore concentrated on means of decreasing the water absorptive characteristics of rayon or, conversely, of improving its hydrophobic properties to the point of equalling cotton and wool in this respect. The Germans had coined the word "hydrophobizing" to describe the treatment of rayon for this purpose.

Their first attempt to solve this problem was by the simple application of water repellent materials. The durable type water repellents which were then known were not considered of sufficient merit to be used in preference to the non-durable types; therefore, the first materials that were tried were wax emulsions containing aluminum salts or soaps. These emulsions were almost identical with those with which we are familiar. In addition to the aluminum salt-wax emulsions, they later used in large quantities similar types containing zirconium salts, and for this purpose, zirconium oxychloride was used almost entirely. This latter type of treatment was considered to be sufficiently durable for use on field jackets, shelter halves, knapsack covers, et. The formulations used for preparing these zirconium emulsions were not very different from those that have been used in this country. They did contain, however, high molecular weight waxes of a type which have not been available to us, and it is possible that these treatments may exhibit some advantage in durability over the corresponding treatments with which we have been familiar.

These water repellent treatments were considered to be quite satisfactory for protection against rain but failed in their ultimate purpose in that they did not materially reduce the water absorptive properties of the rayon fiber. When the fabric eventually became wet the normal loss in tensile strength resulted.

The most important development in durable type water repellents came from the I. G. Farben research laboratories at Ludwigshafen and Hoechst. This was a product known as Persistol VS which consisted of an aqueous dispersion of octadecyl ethylene urea:



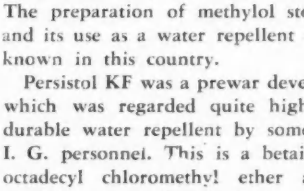
Before discussing this development I would like to mention two other compounds which were used to some extent for water repellent treatment on rayon.

An aqueous dispersion of methylol stearamide

$$C_{17}H_{35}CO.NH.CH_2OH$$

was manufactured under the name of Persistol WS. It was used in combination with dimethylol urea for treatment of staple fiber at the IG. plant at Wolfen. The treated fiber was known as Vistra XTH. This process eventually proved to be unsatisfactory and was discontinued. The preparation of methylol stearamide and its use as a water repellent are well known in this country.

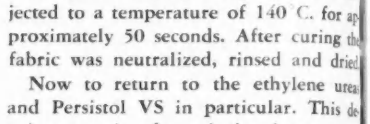
Persistol KF was a prewar development which was regarded quite highly as a durable water repellent by some of the I. G. personnel. This is a betaine from octadecyl chloromethyl ether and the methyl ester of diethyl glycine:



Persistol KF was found to be particularly well adapted for use in combination with urea-formaldehyde finishes. Here it serves as a water repellent and plasticizer for the resin.

A typical padding formula consisted of 150 grams dimethylol urea. 30 grams of Persistol KF and 5 cc. of glycolic acid (70%) per liter. The solution was then adjusted to pH 5.0 with ammonia. After padding and drying the goods were subjected to a temperature of 140° C. for approximately 50 seconds. After curing the fabric was neutralized, rinsed and dried.

Now to return to the ethylene ureas and Persistol VS in particular. This development is of particular interest, not only for the reason that this specific compound seems to possess definite merit, but for the possibilities which it holds for developments along other lines. Quite a number of ethylene ureas of this type were prepared in Germany and I will attempt to discuss them in turn. I think that you might be interested first to learn a little about the preparation of these compounds. They are all prepared by reacting ethylene imine with organic isocyanates.



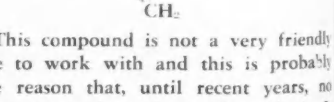
Ethylene imine was first prepared by Gabriel in the year 1895, and the method used today in Germany is essentially the same. Monoethanolamine is the starting material. The hydrochloride is first prepared by treating with anhydrous HCl. This in turn is treated with thionyl chloride to form the chlor-sulfite-ester. By the application of heat, SO_2 is split off and chlorethylamine hydrochloride is formed. The chlorethylamine hydrochloride is then distilled over caustic soda, yielding ethylene imine of fairly high purity.

$$HCl.NH_2C_2H_4OH + SOCl_2 \rightarrow$$

$$HCl.NH_2C_2H_4OSOCl$$

chlorsulfite ester

$$heat \rightarrow HCl.NH_2C_2H_4Cl + SO_2$$



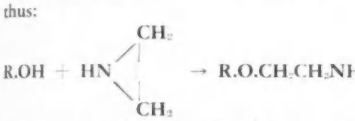
This compound is not a very friendly one to work with and this is probably one reason that, until recent years, no one attempted to do much with it. It possesses the unhealthy characteristic of polymerizing with explosive violence under certain conditions. It is also very inflammable and extremely toxic. It attacks the skin, eyes, respiratory system and kidneys. The first symptoms are red spots on the skin and nausea. After relatively mild exposure to the fumes an individual acquires an extreme sensitivity to the material and merely walking past the manufacturing plant results in a recur-

rence of the physiological effects. Other than for these characteristics, ethylene imine is perfectly harmless. The material is stored in steel containers, each of which contains a piece of solid caustic soda as stabilizer, and the drums are refrigerated at a temperature of 0°C. or lower.

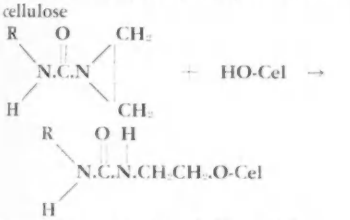
The isocyanates were prepared according to the well-known process which consists of treating the corresponding amines with phosgene.

$$R.NH_2 + COCl_2 \rightarrow R.N\text{-}C\text{-}O + 2HCl$$

As might be expected, the reactivity of ethylene imine resembles ethylene oxide to some extent. It is particularly reactive toward active hydrogen compounds and reacts with alcohols to form amino ethers thus:



but a most important and interesting point is in the reaction with isocyanates to form ethylene ureas where the three-membered ring remains unbroken and the behavior toward active hydrogen compounds is retained to a great extent. Ethylene ureas are therefore capable of reacting with hydroxy compounds such as cellulose



Because of this chemical bond between the fiber and the compound these treatments are claimed to be extremely resistant to laundering and drycleaning. Several mono, di and tri ethylene ureas were prepared and their effect on the rayon fiber studied. Of these the straight chain monofunctional ureas were the only ones found to impart suitable water repellency to the fabric, and the C_{14} compound proved to be the most effective.

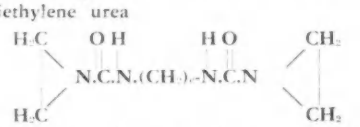
As mentioned before, this compound was supplied in the form of an aqueous emulsion under the name of Persistol VS. For application to yarn or fabric the Persistol VS is diluted with water at room temperature to a concentration of approximately 5%. The goods are then passed thru this emulsion, squeezed and dried in the normal manner at any temperature above 80°C. Reaction with the fiber takes place during the drying operation so that no additional heat treatment is necessary. The product is practically neutral and no by-products are formed during the treating process. It is therefor unnecessary to subject the goods to any washing or neutralizing treatment after drying.

Persistol VS was used for the treatment of rayon staple fiber which was to be blended with wool. This treated fiber was called Vistra XTH3 and the water repellent treatment was claimed to be unaffected by the fulling operation to which the goods were subjected. Persistol VS was also used in conjunction with melamine-formaldehyde condensates for treatment of spun rayon fabrics which were used for uniforms.

The ethylene urea development did not materialize until toward the end of the war and Persistol VS never did get into extensive use on piece goods. Several hundreds of tons were manufactured however at the I. G. plant at Hoechst and most of it was apparently applied at the I. G. rayon plant at Wolfen. Persistol VS had never been applied to cotton.

Before leaving Germany we made arrangements to have 200 kg. of Persistol VS prepared at Hoechst and then shipped to the Philadelphia Quartermaster Depot. When this arrives the quartermaster corps will undoubtedly have evaluation tests made to determine whether this material possesses any merits over those of the durable type repellents with which we are familiar.

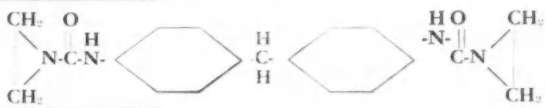
A further development in hydrophobizing or water resistant treatments was a product known under the code designation Ho 1/105. This was hexamethylene diethylene urea



This product is completely water soluble and can therefor penetrate readily into the cellulose fiber. Being difunctional it is capable of attaching to hydroxyl groups in two separate cellulose molecules thereby cross-linking the chains. This cross-linking effect reduces the water absorption capacity of the fiber materially. This product does not impart water repellent characteristics, however. Ho 1/105 has been used in conjunction with Persistol VS for the added advantage of its hydrophobizing effect and to further improve the durability of the water repellent treatment.

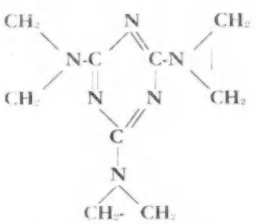
Ho 1/105 has been applied to rayon fabrics at concentrations of 25 to 75 grams per liter. The goods, after padding thru the solution are dried in the normal manner and are then subjected to a temperature of 150°C. for several minutes to insure complete reaction. It is not necessary to wash or neutralize the goods after curing. This product possesses two fairly serious faults. If used on white goods a slight discoloration is noticeable. The compound also has a tendency to migrate on the fabric during the drying process causing unevenness in the finish.

The aromatic ethylene ureas were also studied in relation to their fabric finishing characteristics. One of the most interesting of these was 4,4'-di (ethylene urea)-diphenylmethane



This compound was known as Ho 1/107 and it exhibited much the same properties as Ho 1/105. It was used quite extensively in conjunction with Persistol VS for treatment of Vistra XTH3. It is quite insoluble in water and was therefor supplied in the form of an aqueous emulsion. This product was never applied to piece goods but it certainly should be examined from that angle because it is quite possible that it may impart some quite unusual characteristics to the fiber.

The latest development in ethylene imine chemistry was a trifunctional compound known as Ho 1/193 which was 2,4,6 triethylene imino 1,3,5 triazine



Owing to a critical shortage of ethylene imine this product was never fully evaluated and never was manufactured on a practical scale. The I. G. people believe, however, that this compound offers excellent promise as a hydrophobizing agent for rayon and as a cross-linking agent for wool. It seems to be extremely simple to apply. For application to cellulose fabrics it is dissolved in warm water. The goods are then padded thru this solution and are dried in the normal manner. Reaction with the fiber occurs during the drying operation. Ho 1/193 does not discolor the fabric nor does it migrate during the drying operation. For application to wool a solution containing about 100 grams of Ho 1/193 per liter is used. The wool is immersed in the solution at 60°C. and is kept in motion for about 10 minutes, after which it is removed from the bath extracted and dried in the normal manner. The treated wool is claimed to be resistant to fulling and shrinkage.

That is briefly the summary of the ethy-

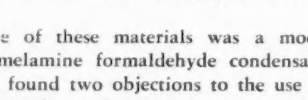
lene urea development. I would like to mention that all of the data which we obtained were acquired from interviews with the I. G. personnel and from records and reports which we were able to find. In many plants the records had been destroyed or transported to parts unknown and we were compelled to rely upon the memory of the men who had been connected with the work. We had no means or facilities to make evaluation studies on any of these products so we were therefor unable to confirm any of the claims made for these compounds. This evaluation work must be done here.

This ethylene urea development suggests many possibilities in textile treatments. In the water repellent field it offers an excellent opportunity for the development of a suitable treatment for wool fabrics. It also might find use in the treatment of nylon and other synthetic fibers for this same purpose. For improvement in the hydrophobic character and dimensional stability of regenerated cellulose fibers it could be of incalculable value. By choosing suitable ethylene ureas it is likely that durable treatments of many other types may be developed.

In addition to the treatments which I have mentioned quite considerable quantities of rayon fabrics were treated with resin-forming materials with the purpose of improving the water resistance of the fiber. Some of these products impart other desirable characteristics to the fabrics, such as resistance to shrinkage and creasing.

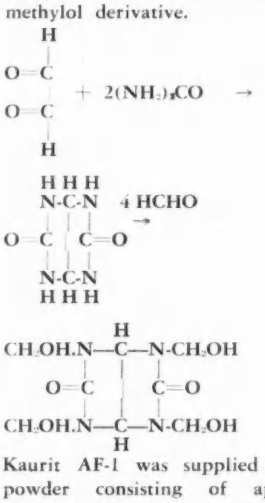
One of these materials was a modified melamine formaldehyde condensate. They found two objections to the use of the straight methylol melamines in that they obtained embrittlement of the fiber and they were not satisfied with the solubility characteristics of the product. They therefore prepared a compound which was sold under the name of Kaurit AK-2 which was made by condensing melamine formaldehyde and triethanolamine. This product was supplied in the form of granular solid containing approximately 60% active material. It was applied to the fabric at concentrations of about 100 grams per liter with 15 grams per liter of zinc nitrate or glycolic acid as catalyst. The goods were padded through this solution, dried, cured and neutralized in the usual manner. They claim for this product improved solubility and less embrittling of the fiber.

Another product of this type known as Kaurit F-1 was also used.



This was an aqueous solution of dimethylol formamide containing 1 mol of loosely bound formaldehyde and is made simply by condensing 1 mol of formamide with 3 mols of formaldehyde. It was applied at a concentration of about 200 grams per liter with 6 to 8 grams of aluminum chloride as catalyst. They claimed that this treatment was fully as effective as the well-known formaldehyde process and was greatly superior in that the application was much more foolproof and more easily controlled. The objectionable odor of formaldehyde is practically eliminated by the use of this material. There is no discoloration of the fabric and very little embrittlement occurs.

One of the most interesting of the formaldehyde yielding compounds which was developed in Germany was a product known as Kaurit AF-1. This is a tetramethylol acetylene diurea and is made in a two-step process. Glyoxal and urea are first condensed to form an acetylene diurea. The acetylene diurea is then reacted with formaldehyde to form the tetramethylol derivative.



Kaurit AF-1 was supplied as a white powder consisting of approximately 100% active material. The product is odorless, indefinitely stable and is readily soluble in water at all temperatures. They claim that both formalization and resin formation occurs during the application of this product. A typical padding formula consisted of about 75 grams per liter of Kaurit AF-1 and 4 grams of ammonium nitrate as a catalyst. After padding and drying the goods were cured at 140°C. for about 5 minutes. No after washing is necessary. This treatment is claimed to impart excellent moisture resistance to the fabric and does not cause any embrittlement of the fiber.

All of the accessible information was obtained on the manufacture, properties and application for all of the products which I have mentioned and it is contained in the report which has been submitted to the Quartermaster General's office. This report will soon be made available to anyone interested through the Publication Board of the Department of Commerce.

* * *

Chairman Appel: I am sure there is a great deal of interest in this report of Mr. Pingree's.

The next speaker is going to give us something right off the griddle. He got off the Queen Mary yesterday noon. I am going to call on Mr. Thomas R. Smith now, of the textile team, to tell us something of his investigations.

Mr. Smith! (Applause)

Note: Mr. Smith's paper is not yet ready for publication. It will appear as soon as available.—Ed.

DISCUSSION

Chairman Appel: I will ask Dr. Dahlen, Mr. Pingree, Mr. Lee and Dr. Crossley to come up here, if they will.

Who has a question of these gentlemen? We have been hearing a lot from them, and now it is your turn to ask questions.

Mr. Chapin: There has been mention of products made in Leverkusen. Is that in pretty good shape; hasn't it been destroyed? It is near Cologne, which was badly bombed.

Dr. Dahlen: Leverkusen is about 10 kilometers north of the center of Cologne, on the east side of the Rhine, and it was not particularly a bombing target. The bombed area was relatively small, though they had quite a bit of damage through artillery firing across the Rhine. I think about 33 per cent destruction was the most they had.

Ludwigshafen was very badly smashed because it was a source of ammonia, nitric acid, aviation gas, synthetic rubber and products of that kind. The vat-dye plants at Ludwigshafen were badly smashed. At Leverkusen they manufactured mostly dyes and pharmaceuticals, so the damage was relatively small.

I don't know the figures of the damage to dyestuff plants in Germany, but I would say the overall picture isn't more than 35 per cent.

Incidentally, I think your question implies this: While cities like Cologne and Dusseldorf were very badly smashed in general, if there had been a plant not on the bombing list, could it escape damage rather well? Dusseldorf was very badly hit. Nevertheless, Henkel and Company, a big producer of soap powders over there—in fact, I think it was the finest plant in Germany—was only superficially damaged, although all around you could find places really smashed up.

Member: Mr. Pingree, how did they test water repellency over in Germany? What did they do to decide whether it was permanent or not permanent? Did they have certain standard equipment; could they test durability? How was

durability and non-durability distinguished? Did they have anything equivalent to Launderometers, and so on?

Mr. Pingree: Their test methods for water repellent finishes were not nearly as highly developed as our test methods here. Most of their testing was done in beakers or what not. In a determination of laundry fastness and dry cleaning fastness, and for evaluation of surface repellency they used equipment which was very similar to ours. They used hydrostatic equipment, pressure equipment, almost identical with Suter apparatus, and they had several modifications of the spray test which amounted to about the same as our conventional test that we have been using here.

Member: Were there any new developments in phthalocyanines, new derivatives or manufacturing processes?

Dr. Dahlen: I think I can answer that. The interest in Germany was about the same as here. They considered the two best phthalocyanines to be Blue B, Copper phthalocyanine, and the Green G type, which is the fully chlorinated phthalocyanine. There were two other phthalocyanine dyestuffs of some interest. One was a pigment made from a phenylphthalonitrile which was a bluer green. I couldn't see from any of their tests that they accomplished much you can't accomplish with mixtures of the other colors.

They were quite interested in a cotton dyestuff which was prepared from a tricarboxy-diphenyl, but that got no further than the laboratories at Leverkusen. However, Dr. Bayer supplied me with a short note from memory and from his records, and he gave me a small dyeing on a skein. But it is hard to tell how good the stuff is. What little we know you will find in the dyestuff report.

Member: In that connection was there much emphasis on the softness properties of those pigments?

Dr. Dahlen: We didn't spend too much time in the pigment field. I rather gathered that far, far more attention is paid in the United States to the physical condition of the pigments than is paid over there. I suppose we could have, if we had tried, found reports on the subject among the reams of stuff in Heidelberg; and days of questioning and quizzing people at great length might have produced more information. But my own opinion is that the market here for pigments is much more stringent than there.

Member: I would like to ask Mr. Pingree about the durability of Persistol VS as compared to Kaurit.

Mr. Pingree: That is Kaurit AF-1. It was claimed to be even more resistant to laundering and dry cleaning than Persistol VS. It is a tetra-functional material and capable of attaching in four places. For that reason they claim extreme fastness to laundering and dry cleaning.

Member: Were their durable water repellents more durable than ours here?

Mr. Pingree: We only have the word of the German technical men for that. They claim they are much more durable. Whether they are or not remains to be seen.

Member: Do they use plastics in their textiles?

Mr. Pingree: Plastics were used to quite some extent for more or less the same purposes than they have been used by us. The melamine formaldehyde resins were used and in addition to that they used in quite considerable quantities vinyl resin emulsions for coatings on raincoat fabrics and such. For that purpose they used apparently the same types we are using.

Chairman Appel: I want to thank all of our speakers as we close this session. The meeting is now adjourned. (Applause)

. . . Thereupon at 5:30 o'clock the meeting adjourned . . .

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MEMBERSHIP APPLICATIONS

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Leo J. Cawley—Vice President, Dolanize Co., Bronx, N. Y.

William H. Drum—General Mgr., Louden Hosiery Dyeing & Finishing Co., Philadelphia, Pa.

Elwood F. Jones—Office Mgr., Louden Hosiery Dyeing & Finishing Co., Philadelphia, Pa.

Victor G. Trujillo—President, Compania Anonima Silka, Caracas, Venezuela.

STUDENT

Paul F. Atchison—Student, New Bedford Textile School, New Bedford, Mass. Sponsor: F. Tripp.

Paul H. Bouffier—Student, New Bedford Textile School, New Bedford, Mass. Sponsor: F. Tripp.

William E. Bradley—Student, New Bedford Textile School, New Bedford, Mass. Sponsor: F. Tripp.

Richard A. Carrier—Student, New Bedford Textile School, New Bedford, Mass. Sponsor: F. Tripp.

Amelia Eaton—Student, New Bedford Textile School, New Bedford, Mass. Sponsor: F. Tripp.

Jesse Edenbaum—Student, Rhode Island School of Design, Providence, R. I. Sponsor: W. Fales.

Wesley A. Gaddes—Student, New Bedford Textile School, New Bedford, Mass. Sponsor: F. Tripp.

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Philip Madeiros, Jr.—Student, New Bedford Textile School, New Bedford, Mass. Sponsor: F. Tripp.

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Duncan U. Nesbitt—Student, Georgia School of Technology, Atlanta, Ga. Sponsor: C. A. Jones.

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FOR TRANSFER TO SENIOR MEMBERSHIP

Walter H. Jaeger, William B. Kaupin, George H. Small, H. E. Tanguay, William D. Thompson.

Your
RED CROSS
must
carry on!

Proceedings of the American Association of Textile Chemists and Colorists

Facts and Fiction About FIBERS AND FINISHES*

RAYMOND B. SEYMOUR
Industrial Research Institute
University of Chattanooga
Chattanooga, Tennessee

MAN'S basic requirements of food, shelter and clothing have been fulfilled for thousands of years and, while they were originally quite simple and primitive, they did satisfy his needs. Primitive man obtained his food by hunting and by gathering herbs and berries, his shelter from caves and his clothing from animal skins. As he became more civilized he engaged in agriculture in order to obtain additional supplies of both food and clothing. A century ago man had access to a few naturally occurring fibers; namely, cotton, wool, flax and silk. Today we have all these basic fibers, man-made derivatives of these and many new synthetic fibers. The perfect fiber has not been found but, since most applications are for certain specific uses, it is generally possible to obtain a suitable fabric by the correct choice of fiber and finishing operation.

The textile business, which is the second largest peacetime industry in this country, is no longer completely dependent upon rule-of-thumb techniques, since considerable fundamental and applied research has been done in an attempt to improve the naturally occurring fibers and to develop new and improved synthetics. Today there are such organizations as the Institute of Textile Technology, Cotton Textile Institute, Textile Foundation, Textile Research Institute, Calloway Institute, Milton Harris Associates and many others, whose prime function is research in textiles. Textile research is also being undertaken at many industrial research institutes and we expect to have projects in this field at the Industrial Research Institute of the University of Chattanooga. The regional laboratories of the Department of Agriculture are all engaged in textile research and practically every large industrial research laboratory has at least one group working on investigations of synthetic fibers and finishes. All these activities should bear fruit and help to build a better textile industry based on scientific research.

Today, the 13,000,000 people, whose livelihood is dependent upon cotton, are very interested in these research activities, since some fear that cotton may be replaced by some of the new synthetics. Actually, the competition from synthetic fibers will be helpful to coton, since it will help stabilize the price and will provide an incentive to obtain better cotton textiles and new uses for cotton. Cotton will continue to be used in large amounts, but it will not retain 80 per cent of the fiber business.

Rayon is not a true synthetic, since the various types of rayon are obtained by, either, a physical or a chemical modification of the naturally occurring cellulose. These reaction products of natural occurring fiber type materials are called artificial fibers. They are products of research and rank next to cotton in the total poundage produced in the United States. Wool ranks third and, while nylon, Saran, Vinyon and other synthetics will be produced in larger amounts in the near future, their present production is a very small percentage of the total fiber industry.

Fibers are all high molecular weight products and are related structurally to plastics and rubber. According to Mark, the criterion which determines whether a macromolecule is a rubber, a plastic or a fiber is based upon its ability to crystallize. If the chain-like molecules fit well into a lattice they will crystallize and be fiber-like. If the forces between the chains are greater than 5,000 calories per unit mol, the product will exhibit the properties of a fiber. If the forces are less than 2,000 calories per mol the product will be rubbery, and products having values in-between will be plastics.

All molecules must possess a certain minimum chain-length in order to yield rubber, plastics or fibers, and some improvement in intrinsic properties is noted as the molecular chains are increased up to a certain point. Further increase in chain length shows little improvement in properties. Most properties of fibers are associated with the groups present in the molecular chain. These groups determine the Van der Waal forces, which are the main forces to consider in the field of high polymers. In any operational failure of high polymers, it is the secondary valences or Van der Waals forces and not the primary valences that are ruptured. The force necessary to break the carbon to carbon bond in a fiber is in the order of 150 grams per denier or about 15 times the highest obtainable value for any fiber. The rupture of a fiber, plastic or rubber is usually the result of a slipping of the chains. This slipping can be controlled to a certain extent by the type and position of groups in the chain. Amorphous materials have loose packing and few Van der Waals forces are present, but if one orients these materials, the Van der Waals forces are brought into play and high strengths are developed. Our present conception of fiber molecules are long chains of parallel threads having areas of crystallinity in the direction of the fiber, as well as non-crystalline regions. When the molecule is highly branched, rather than thread-like, there is poor packing and the physical properties are inferior.

Natural occurring fibers may be classed according to their original. The animal fibers, silk and wool, are proteinoid in structure, although the sheep and silk worm depend to a large extent on a carbohydrate diet for their fiber production. The silk molecule is made up of 6 amino acids, mainly glycine, alanine and tyrosine, and wool keratin contains 16 amino acids in which glutamic acid, leucine and arginine predominate. Silk has not been an important commodity in this country during the war years but experiments in producing silk in Texas are being watched with interest. This project still makes use of worms but the process from the cocoon on is highly mechanized. Wool fibers can be stretched nearly 100 per cent when steamed due to an unfolding of the chain-like molecules. Similar groups are 5.1 Å. apart in natural wool but in stretched wool this distance is only 3.4 Å. Wool and silk are amides and as such will undergo type reactions such as acetylation or reactions with aldehydes. Wool contains many disulphide linkages which can be reduced with thioglycollic acid and the resulting mercaptan, can be acetylated with an alkyl halide or oxidized. Thus, cross-linking can be controlled and wool can be obtained that is alkali and moth resistant.

The vegetable fibers are cellulosic and contain 2,000 to 3,000 beta glucose pyranose units. Starch differs principally from cellulose in the physical arrangement of the glucose units and the degree of branching in the chain. Cellulose has three reactive hydroxyl groups in each

* Presented at meeting, South Central Section, November 10, 1945.

glucose unit which will react with alkali, organic acids, anhydrides, acyl chlorides, Schweitzer's reagent, nitric acid, ethylene oxide, aldehydes, inorganic acids and salts. Because of the presence of three hydroxyl groups, there are 8 possible substitutions in each glucose unit, hence the number of possible arrangements in any chain is very large. A chain of 100 glucose units, having an average of three substituents for each two glucose units, theoretically, could have 1×10^{90} different possible structures. A sample containing all these structures would weigh 1×10^{63} tons. Of course, all such probable structures are not actually obtained but, since the starting material is made up of molecules having different molecular weights and the reaction products are based on chance to a certain extent, the products are far from uniform.

Esterification with acetic anhydride tends to involve all three hydroxyl groups and it is necessary to saponify one ester group in order to obtain a suitable fiber. Cellulose acetate is thermoplastic, has a low softening point and good resistance. As the chain length of the reacting anhydride is increased, the melting point of the product decreases until an ester containing 9 carbons is obtained. Higher molecular weight substituents results in an increase in the melting point, since when large groups are present on the side chains, the total molecular weight is more significant than the Van der Waal forces. Mixed esters can be obtained and cellulose aceto butyrate has been produced commercially. Cellulose acetate finds wide use in both the plastic and fabric fields and accounts for 13 per cent of all rayon sold. When this product is completely saponified a strong regenerated cellulose called Fortisan is obtained. Acetals can be formed with aldehydes and, if cellulose is reacted with a mixture of acetic anhydrides and formaldehyde, an esterified half acetal is obtained.

Cellulose nitrate has been widely used in the plastic and coating fields. Formerly cellulose nitrate was denitrated by sodium acid sulphide in the Chardonnet process to obtain a regenerated cellulose, but this process is no longer used in this country. Cellulose dissolves in Schweitzer's reagent $Cu(OH)_2(NH_3)_4$ and can be regenerated from the resulting solution by precipitation in acid. At the present only two companies in the United States are using the cuprammonium process and this accounts for 3.5 per cent of our total rayon production.

A 17.5-18 per cent aqueous solution of sodium hydroxide causes contraction of cellulose fibers and the resulting product has greater strength and better dye acceptance. When this process takes place under tension, the cotton fiber loses its convolutions and becomes cylindrical. The tension evidently allows the secondary valence forces to be more effective. The washed product is called hydrate or mercerized cellulose and will revert to the original form if heated in the presence of a polar solvent. Mercerization was really the first basic improvement in the history of fibers. Treatment of cotton textiles with alkali yields an extensible cloth that may be used for bandages.

The reaction of cellulose with alkali to form alkali cellulose and the subsequent reaction with carbon disulphide yields cellulose xanthate which can be forced through spinnerettes into sulphuric acid to form viscose rayon. At present 70 per cent of the rayon in the United States is produced by this process. Cellophane is obtained in a similar manner. The production of rayon is considered to be the secondary basic improvement in the history of fiber.

Alkali cellulose reacts with alkyl halides to produce cellulose ethers. Methyl cellulose is water soluble and has been used as a sizing and as a water soluble fiber. Ethyl cellulose has been used as a plastic, film and fiber. The reaction of sodium chloroacetate with alkali cellulose or ethylene oxide with cellulose also produces water soluble products.

The third basic improvement in textiles is said to be the development of synthetic dyes and the fourth is the synthesis of nylon. Nylon is an outstanding fiber and is a classic example of research in action. It had an advantage over rayon, since it was perfected before being offered for sale. In contrast to the artificial fibers obtained by modification of naturally occurring fibrous materials, nylon is a true synthetic. Dr. Carothers' first experiments were with polyesters but the softening points of these products were too low and, hence, the work in polyamides was emphasized. Nylon is produced by the dehydration of the salt formed by the reaction of a dibasic acid and a diamine. When this material is forced through spinnerettes and cold drawn, a fiber having superior strength is obtained. At least ten different types of nylon are fabricated and since a large number of different acids and amines could be used, thousands of different types of nylon are possible. Nylon can be preboarded, is impervious to rot, is crease resistant, and mildew and mothproof but is somewhat sensitive to sunlight.

During the war the Germans produced a polyurethane, which they claimed to be superior to nylon. This product was obtained by the condensation of butanediol-1,4 and hexamethylane diisocyanate. Its chemical structure is quite similar to nylon 6, 6.

Considerable research has been done on the production of fibers from corpuscular proteins. None of these has been as good as wool but, in general, they are more economically produced. While fibers have been obtained from hair, feathers, egg albumen, casein, soy beans, zein, peanut protein, sea weed and fish, only the casein product is in volume production. It is sold under the names of Lanital, Tiolan, and Aralac and is noted for its good draping qualities. Peanut fiber, under the name of Ardil, is being produced in England and is being investigated at the Southern Regional Laboratories. Those who are working in this field believe that there is little difference among the various artificial fibers from proteins and believe their future will depend upon availability and economics. Ardil can be a worthwhile fiber but only when sufficient research has been done on peanut culture to permit production of peanuts without depleting the soil. Since fibers of some sort have been made from about every protein imaginable, the old adage that "one cannot make a purse out of a sow's ear" is no longer significant.

A large number of the new synthetic thermoplastics are obtained by an addition type polymerization of vinyl compounds and, since plastics and fibers are closely related, most of these materials have been tested as fibers. Today fibers or monofilaments from Geon Vitafilm, Polythene, Polystyrene, Polyacrylonitrile, Vinyon, and Saran are being investigated, but only the last two are in large volume production. Polystyrene fiber, called Polyfiber, was produced in sizable quantities during the war but was used for the production of low density molded products.

Other fibers have been obtained from redwood bark, aluminum and glass. Fiberglas is quite brittle but, due to its fire, vermin and chemical resistance, it has found considerable use. During the war it was used as a reenforcement for impression molded plastics which have outstanding strength and good flame resistance.

The art of coating textiles is very old but this process fills up the interstices of the fabric and lowers its tear resistance. All types of plastics, and both natural and synthetic rubber, have been used as coatings but the trend is towards finishes which will bring about improvements without affecting the appearance of the fabric appreciably.

In the Plexon process, yarn is coated with plastic prior to weaving. Improved materials are obtained, yet the fabrics can breathe. Such coated yarns are also used for bristles and fish lines.

The treatment of cotton with thermo-

plastics is bringing about a new technique of textile production, in which spinning and weaving are eliminated. In this process, which resembles the felting of wool, cotton is passed through rollers, treated with an aqueous solution or emulsion of a thermoplastic, and then passed through hot rollers. The non-woven product can be produced economically and has been used for disposable diapers, filters, and dental bibs. This type of product, which is called Bonnlin, Masslin, or Webril, can be welded to other pieces of the same material by the application of heat.

Formerly, starches, gums, resins, glues, and tallows were used as finishing agents but the results were not permanent and were often lost with the first washing. Research in the field of finishes has been directed toward obtaining water repellency, shrinkage control, and crease, abrasion, flame, mildew and moth resistance.

It has been known for years that water could be held in a sieve if the wire were treated with a water repellent agent. Water repellent woolen fabric was obtained during the Middle Ages by leaving much of the wool grease in the fiber. During recent years du Pont has produced a water repellent process, called Zelan, in which cloth is treated with such materials as stearyl oxymethyl pyridinium chloride in the presence of an emulsion of polymethyl methacrylate. Many other firms have introduced other water repellent products and several of these employ aqueous emulsions of derivatives of long chain fatty acids and polymers or polymer-forming materials. Silicones are very good water repellents but they are expensive and their method of application is not adaptable to present mill equipment.

Crease resistance and shrinkage control have been obtained by the impregnation of the fabric with methylol melamine followed by polymerization in situ. The process is known as Lanaset or Resloom, depending upon whether the melamine derivative is obtained from American Cyanamid or Monsanto Chemical Company. Methylol urea and A stage phenol formaldehyde resins have also been used but some tests have indicated that these are inferior to the melamine compound for this application. The materials are not effective until polymerized and the polymerization process can be controlled by observing the rate of dyeing, since the presence of polymers impedes the penetration of dyes. Many attempts to prove that the resin is within the fiber have been made, but the evidence is not conclusive. Good shrinkage control has also been obtained by treatment of wool with an emulsion of styrene-butadiene copolymer in which the styrene is the larger component. Obviously, there is little fiber penetration in this application.

The English have used methylol ura for crease resistance and have chlorinated wool with calcium hypochlorite to control shrinkage. The Japanese used a simpler non-chemical process. They equipped their soldiers with heelless socks which would fit any foot no matter how much shrinkage took place.

Since the tensile strength of fibers depends principally on the Van der Waals forces between the chains, it is of utmost importance to increase these forces and, therefore, reduce the slippage between the chains. Actually only 35 per cent of the theoretical strength of cotton is ordinarily obtained in textiles due to slippage. Some improvement in slippage control has been obtained by spinning cotton fibers with a twist. This twisting must be controlled, since too much twisting develops a shearing action and, thus, tensile strength is decreased. Seventy to eighty per cent improvement in tensile strength has been obtained by adding resinous materials to cotton yarns under tension.

Syton W-20, which is colloidal silica, is said to give non-skid surfaces to fibers, thus, controlling slippage. Considerable work has been done on fiber treatment with Syton and improvement in tensile strength has been obtained in the laboratory, but the treated fibers are difficult to spin and tend to have a shearing action on each other. However, treatment of hosiery and suiting material with Syton has reduced runs and shine, respectively.

Flame resistance of cloth has been obtained with methylol urea, antimony oxide, zinc borate, ammonium phosphate, and chlorinated paraffins. Improvement in resistance to abrasion has been obtained by coating with emulsions of polystyrene. Resistance to mildew has been obtained by treatment with copper naphthenates. Partially acetylated cotton fabric is also resistant to mildew and weathering.

Water soluble resins; such as, hydroxyethyl cellulose, methyl cellulose, sodium carboxymethyl cellulose and polyethylene oxide, are being investigated as textile treating agents but many of these can be considered to be still in an experimental stage.

In the future we will have numerous fibers and finishes available, so that a satisfactory product can be truly tailor-made for each application. Of course, price will often be more important than performance and, therefore, untreated cotton will continue to be widely used, but improved cotton and synthetic fibers will gain in importance. If we will simply consider the large number of fibers and finishes that will be available and remember that many different combinations and blends can be used, then we can obtain a good idea of the future of the textile industry.

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MEETING, MID-WEST SECTION

THE Winter Meeting of the Mid-west Section was held at the Bismark Hotel, Chicago, Illinois, February 16th, 1946.

The afternoon meeting was called to order at 2:25 P.M. and 75 members and guests were present.

Our guest speaker, Hanry E. Millson of Calco Chemical Division of American Cyanamid Company was introduced by A. Feit. His lecture was entitled "Current Aspects of Interest in Dyeing." Mr. Millson's remarks were illustrated with Kodachrome slides in tandem for comparative purposes. A short discussion followed.

Information Forum

There was only one question submitted to the board of experts. The question was: What methods are used to increase level dyeing of vat dyes on rayon rawstock?

Mr. Ericson discussed Levelene in this connection.

Meeting adjourned at 4:00 P.M.

Dinner was served at 7:20 P.M. and 79 members and guests were present.

After dinner the minutes of the previous meeting and the Treasurer's report were accepted as read.

At this point T. Latham made a motion seconded by Mr. Gertz Krit that the secretary be instructed to send flowers expressing our sympathy in the passing of Charlie Gruber. This was carried out.

Al. Feit then discussed the National Convention for 1946. He stated that the Midwest Section had obligingly agreed to relinquish the 1946 date in favor of the New England Section in honor of the 25th anniversary of the organization. The 1946 Convention will therefore be held in Boston in December, 1946. The Midwest Section expects to have the 1947 Convention at the Congress Hotel in Chicago.

Elmer Smith moved that a Summer Outing be held and a tentative date set for June 22nd. Carried. Clarence Wille moved that the Outing be held at Lake Lawn, Delavan, Wisconsin. Carried. Eric Camp was appointed chairman of the Outing Committee.

A. Alexander and Louie Hoehn presented their ideas on the relative dates for the Outing and Spring Meeting and it was decided to have the Spring Meeting, May 4th at the Schroeder Hotel in Milwaukee, Wisconsin.

New Business

The following new and reinstated members were introduced:

Elliott Morrill of Rit Products Cor-

poration, R. C. Cochrane of DuPont and Charles Post of Phoenix Hosiery Company.

On a motion by Clarence Wille the meeting was adjourned at 8:55 P.M.

Respectfully submitted,

George Chabot,

Secretary, Midwest Section.

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SOUTHEASTERN SECTION ACTIVITIES

A MEETING of the Executive Committee of the Southeastern Section was held on February 2nd in Atlanta, Ga. The following committee chairmen were appointed:

Program—W. B. Griffin.
Paper—M. T. Barnhill.
Membership—H. L. Dozier.
Publicity—J. C. Farrow
Corporations—Norman Arnold.
Arrangements—A. J. Morse.

A dinner meeting of the Section will be held at the Ralston Hotel, Columbus, Ga., on April 20th, with Mr. Griffin in charge of the program and Mr. Morse in charge of arrangements.

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MEETING, NEW YORK SECTION

A MEETING of the New York Section was held on Friday evening, February 15th, 1946, at the Downtown Athletic Club, New York City. An informal dinner preceded the meeting.

The chairman, Emmett J. Driscoll, emphasized the necessity of members purchasing their dinner tickets in advance inasmuch as there were still many restrictions and difficulties in preparing and serving food. He announced that the subject of the meeting on March 29th would be "Plastics."

The chairman next presented a report of the "Victory Convention" held under the auspices of this section on January 3, 4 and 5 at the Hotel Pennsylvania, New York City. He gave a chronological outline of developments which culminated in the convention. He indicated that there were a total of 1410 registrations for the meetings and that there were over 3,000 visitors who attended the open showing of the exhibits on Saturday afternoon, January 5th. He further reported that, with all bills paid, there remained a substantial balance. A rising vote of thanks was given the members of the convention committees for successful completion of their work.

The technical program consisted of four papers on "New Advanced Testing Instruments." The subjects and speakers were as follows:

"Outline of Stability of Color Matching Lamps" by F. C. Reinshield, Analyte Instruments, Inc.

AMONG THOSE PRESENT AT THE MEETING OF THE NEW YORK SECTION ON FEBRUARY 15th.

"An Advanced Fabric Wear Tester" by W. H. Masterson, Better Fabrics Testing Bureau.

"New Instrument for Determining Chlorine Retention" by Walter Stump, Crown Tested Dept., American Viscose Corp.

"The Continuous Indicating pH Meter —Line Operated" by Frank Paully, Macbeth Corp.

A short discussion period followed the presentation of the papers. With the exception of the wear tester, the instruments were on display and demonstrated.

The attendance was about 200.

Respectfully submitted,
Norman A. Johnson, *Secretary*.

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MEETING, RHODE ISLAND SECTION

A MEETING of the Rhode Island Section was held on February 22nd at the Providence Engineering Society Hall, Providence, R. I. Approximately 150 persons were present.

F. D. Snyder, consulting and application engineer, Westinghouse Electric Corp., spoke on "Textile Application of High Frequency Dielectric Heat." He discussed the many applications such as drying and twist setting and pointed out that heat treatments are widely used in all phases of textile processing.

Elliot Broadbeat, assistant manager, Glenlyon Print Works, spoke on the "Textile Printing Industry in Germany" and Glenn Dale Jackson, Jr., agent, finish and fabric development, United States Finishing Co., spoke on "Rayon Piece Goods Dyeing and Finishing in Germany." Mr. Broadbent and Mr. Jackson were members of a group of investigators sent by the Office of the Quartermaster General to investigate German developments in textile processing.

The next meeting of this section will be held on March 22nd. Speakers and their subjects are as follows: Walter Ridley, sales manager for the textile industries, Foxboro Co., "Control Instruments and their Application in Textile Dyeing"; William D. Fales, head of the textile and clothing division (days), and supervisor of the evening extension school, Rhode Island School of Design—"Textile Education".

Respectfully submitted,
James C. Shore,
Secretary.

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CORRECTION

It has been brought to our attention that the fabric shown on page 50 of our January 28th issue, which was credited to Kenyon Piece Dye Works, should have been credited to Kenyon Finishing Co. of Lawrence, Massachusetts.

1945
YEAR BOOKS

The Year Book has now been mailed.

MEMBERS
of the
ASSOCIATION
should notify
the
SECRETARY
immediately
of any changes in
ADDRESS

DO NOT
NOTIFY THE
American
Dyestuff Reporter

NOTICE
to Secretaries
of Local Sections

Please Keep Us Informed of Your Future Meeting Dates.

American
Dyestuff Reporter

CALENDAR OF COMING EVENTS

NORTHERN NEW ENGLAND SECTION:
Meetings: March 22, May 17.
Outing: June 7

RHODE ISLAND SECTION:
Meetings: March 22, April 26.
(Providence Engineering Society Hall, 195 Angell Street, Providence, R. I.)

PHILADELPHIA SECTION:
Meetings: April 12, May 24.

NEW YORK SECTION:
Meetings: March 29, May 3.
(Downtown Athletic Club, 19 West St., New York City.)

MID-WEST SECTION:
Meeting: May 4.
(Schroeder Hotel, Milwaukee, Wis.)
Outing: June 22 (Tentative).
(Lake Lawn, Delavan, Wis.)

SUB-COMMITTEES:
Meeting: April 4.
(Hotel Commodore, New York City. Chairmen of sub-committees who wish to hold meetings should notify the chairman of the Research Committee.)

COUNCIL:
Meeting: April 5.
(Hotel Commodore, New York City.)

RESEARCH COMMITTEE:
Meeting: April 5.
(Hotel Commodore, New York City.)

PIEDMONT SECTION:
Meeting: April 16.
(Robert E. Lee Hotel, Winston Salem, N. C.)

SOUTH CENTRAL SECTION:
Meeting: April 13

SOUTHEASTERN SECTION
Meeting: April 20.
(Ralston Hotel, Columbus, Ga.)

NATIONAL CONVENTION:
Silver Anniversary Convention: December 12, 13 and 14.
(Hotel Statler, Boston, Mass.)

TRADE NOTES • NEW PRODUCTS

A.A.A.S.—GIBSON ISLAND CONFERENCES

Frontiers in Chemistry

SUMNER B. TWISS, Director

This is the ninth summer that special research conferences on chemistry and its allied fields have been held at Gibson Island under the auspices of the American Association for the Advancement of Science. Conferences for the summer of 1946 are scheduled for the weeks of June 17 through August 23. Applications to attend these conferences should be sent to Sumner B. Twiss, Wayne University, Detroit, Michigan.

Textiles

D. H. Powers, Chairman.

W. A. Sisson, Vice-Chairman.

July 8

Ross Whitman. "Curl in Woven Textile Fabrics: Its Cause and Control."

Stanley Backer. "The Relation of Fiber and Fabric Structure to Wear Resistance and Durability."

July 9

C. L. Mantell. "Some Notes on Cellulose Solvents and Their Application to Special Textile Finishes."

F. T. Peirce. "Cloth Geometry and Its Application to Functional Design."

July 10

H. W. Mohrman and R. J. Schatz. "The Effect of Textile Sizing Agents Upon the Physical Properties of Cotton Fabric Laminates."

M. T. O'Shaughnessy and L. G. Ray. "Tensile and Torsional Properties of Textile Fibers."

July 11

W. J. Hamburger. "Load-Deflection-Time Relationships in Textiles."

H. Mark. "Structural Principles for Resiliency and Recovery in Fibers."

July 12.

S. Coppick, R. W. Little, and J. H. Church. "Chemical Behavior of Cellulose under Influence of Retardants at Combustion Temperatures."

• JOINS NAVAL AIR STATION

Margaret B. Hays, Lieut. S.C. (W) U.S.N.R., has been released to inactive duty by the Navy. She has gone to the Naval Air Experiment Station, Navy Yard, Philadelphia, to be in charge of the textile section of the materials division.

While on active duty, Miss Hays was stationed at the Naval Clothing Depot in Brooklyn as Officer in Charge of the Sales and Survey Group. This involved the disposal of surplus material.

Prior to entering the Navy, Miss Hays was employed as Textile Physicist by the Bureau of Human Nutrition and Home Economics, U. S. Department of Agriculture. For 14½ years she conducted research on the physical properties of textiles in that Bureau.

Miss Hays is a member of A.A.T.T. and Committee D13, A.S.T.M.

• JOINS ARIDYE

Aridye Corporation, Fair Lawn, New Jersey announces that E. R. Adair has joined the Company as technical representative, with headquarters at Rock Hill, South Carolina. Following his graduation from Furman University in 1933, Mr. Adair was connected with Southern Bleachery and Print Works, Inc. until 1943. He served in the Army during the war and more recently was on the sales staff of F. H. Ross & Company.

• TO SELL "CEGLIN" DIRECT

Sylvania Industrial Corporation has organized a Sales and Technical Division to handle its "Ceglin" textile finishes, and in line with its customary sales policy on other products, will sell directly to the trade in the future. Up until the present time Aridye Corporation and Aqua-Sec Corporation have been acting as sales agents for these finishes.

In announcing this change in its distribution set-up the company pointed out that with the increased quantities of "Ceglin" available with the end of the war, a growing number of textile firms are using it on many types of cloth to give a better hand, make them lint free and enable them to withstand laundering and actual wear more successfully. Methods of applying "Ceglin" finishes to damasks, sheetings, bed spreads, work clothes, cottons, rayon filament and spun rayon dress goods are covered in a technical booklet recently issued by the company.

Sylvania Industrial Corporation will maintain a technical staff to assist manufacturers on application procedure, and under the new marketing arrangement salesmen and technical men will operate as a unit, with offices at 122 East 42nd Street, New York 17.

• STEIN, HALL CONFERENCE

Branch Managers of Stein, Hall & Co., Inc., from 12 cities in this country and Canada attended a conference with executives and home office officials at the Murray Hill Hotel, New York, February 7 and 8. This was the first branch managers' meeting since the company's reorganization. A considerable part of the program was devoted to discussing means of better coordination between branch office and home office activities.

Conference speakers included: Edwin Stein, President; M. S. Rosenthal, Executive Vice-President; D. M. Hawley, Vice-President, O. H. Clapp, Vice-President in Charge of Sales; Robert Rau, Treasurer; G. W. Brew, Traffic Manager; M. M. Kroll, Credit Manager and J. R. Adams, Manager Development Department of the Technical Division.

Branch Managers present were: R. D. Armstrong, Boston; J. A. King, Providence; W. B. Gager, Rochester, N. Y.; C. J. Dunachie, New York; E. I. Stokes, Philadelphia; I. L. Griffin, Charlotte, N. C.; G. A. Krisan, Chicago; R. D. McCarron, Cincinnati; G. N. Streit, Detroit; R. D. Smith, New Orleans; E. A. O'Neill, St. Louis. Also attending were David McGill, General Manager, Stein-Hall Ltd., Toronto, Ontario, Canada and W. N. Kline, Jr., Assistant Charlotte Branch Manager.

• SOUTHERN DIVISION, NATIONAL STARCH

In order to improve their service in the South Central states and keep pace with the growth of Southern industry, National Starch Products Inc. announces the opening of a new Southern Division with headquarters at 1200 South Front Street, New Orleans, under the managership of H. F. Stegall.

Before joining National early in 1944, Fred Stegall was for two years Chief of the Grain Pricing Section in Washington and prior to that, southern representative for General Foods.

He is a graduate of the University of Chattanooga and a native of the South with broad experience in sales and service work.

The new Division, which is expected to form the nucleus of National's expanding activities in the area, will serve Louisiana, Texas, Oklahoma, Arkansas, Mississippi, and Western Tennessee.

● ELECTED DUPONT DIRECTOR

J. Warren Kinsman, general manager of the Fabrics and Finishes Department of the DuPont Company, has been elected by the Board of Directors as a director to succeed John J. Raskob, who resigned his position as a director and vice-president.

Mr. Kinsman started with the DuPont Company on May 1, 1915, as a foreman in the Bayway, N. J., plant of the High Explosives Operating Department. In 1917 he spent a short time in the Fabrikoid Department and was then transferred to the sales department at the former DuPont Chemical Works. After serving as assistant supervisor in the smokeless powder plant at Carney's Point, N. J., in 1918, he spent two more years in DuPont Chemical Works sales, and then was made a special assistant in the Dyestuffs Department. In 1924 he became assistant director of sales for that department, and in 1929 director of sales for the Organic Chemicals Division.

Two years later he became director of sales for Intermediates and Exports and manager of the Alcohol Division of the newly-formed Organic Chemicals Department. In August of 1941 he was appointed assistant general manager of the Plastics Department. He was transferred to the same post in the Organic Chemicals Department in February, 1943, and took his present post in October of 1944.

● STABILIZE RAYON

With a new process developed by Sylvania Industrial Corporation, knitted or woven rayon fabrics can be stabilized without preshrinking, according to the terms of a patent issued to the company in the name of James A. Clark, technologist in its Textile Finishes Division.

In the Clark process the fabric is padded with an alkali soluble, water insoluble cellulose ether, such as Sylvania's Ceglin. Usually, when strongly alkaline solutions are applied to viscose rayon, adverse swelling of the fabric occurs, but this process avoids that difficulty by carrying out the treatment at a temperature high enough so that the alkali in the solution does not have that effect.

After this treatment, the cellulose ether is coagulated on the cloth while the fabric is maintained at the desired dimensions. It forms a tough film around each fiber and tends to fix the position of the yarns and fibers in the fabric, and in that way stabilizes it to size.

While the alkali soluble cellulose ethers have been known since their invention by Dr. Leon Lilienfeld around 1920, Sylvania Industrial Corporation's new process, it is claimed, represents the first successful application of them to viscose rayon materials.

Nelson F. Wilmot, who has been appointed Chicago District Sales Manager of Mathieson Alkali Works. Mr. Wilmot is widely known in the chemical trade and has been with Mathieson since 1931. He is a native of Rochester, New York, and attended Massachusetts Institute of Technology.

● JOINS AMERICAN VISCOSE

James A. Truslow, formerly with the Whitin Machine Works and recently a Captain in the U. S. Naval Reserve, has joined the American Viscose Corporation as overseas representative, in which position he will be responsible for keeping the company abreast of textile and other related developments outside of the United States.

Mr. Truslow, a graduate of the Massachusetts Institute of Technology, has played an important part in the development and improvement of handling rayon staple fiber on the cotton spinning system in the United States. While with Whitin Machine Works he traveled extensively abroad, and during 1945 headed the Textile Subcommittee of the Technical Industrial Intelligence Committee mission to Europe.

● PHILADELPHIA FOUNDATION COMMITTEES

Millard D. Brown, President of the Board of Trustees of The Philadelphia Textile Institute Foundation, today announced the names of those who will comprise the standing committees and carry on the enlarged activities of the Foundation.

"The fund subscribed to the Foundation," said Mr. Brown, "now exceeds $900,000.00, and is still growing. We, as Trustees, feel strongly our obligation to the contributors and other well wishers to keep them advised of the plans of the Foundation for the future and the progress toward our goal.

The results to date indicate that the Textile and Allied Industries are cognizant of their stake in the success of our plans and will lend their full support to the realization of these plans."

The Committees are as follows:

Membership Committee: DeHaven Butterworth, V. P., H. W. Butterworth & Sons Co., Chairman; Russell C. Osborne, Rider-Osborne-Devine, Inc.; Clarence L. Ederer, V.P. and Treas., Ederer, Inc.

Finance & Budget Committee: Millard D. Brown, Pres., Continental Mills, Inc., Chairman; Edward H. Rakestraw, Hyde-Rakestraw Co.; James L. Shields, Sec. Treas., Charles J. Webb Sons Co., Inc.

Building Committee: Theodore B. Hayward, Manager Phila. Wool Dept., Swift & Co., Chiarman; Russell C. Osborne, V.P., Rider-Osborne-Devine, Inc.; Everett L. Kent, Pres., Kent Mfg. Company; Lindsey H. Mason, Pres., S & M Dye Works, Inc.; Richard S. Cox, Dean, Philadelphia Textile Institute.

Public Information Committee: Alban Eavenson, Eavenson & Levering Co., Chairman; Robert A. Smith, American Viscose Corp.; Millard D. Brown, Pres., Continental Mills, Inc.; Emil R. Pohlers, Executive Director of the Foundation; Edward H. Rakestraw, Hyde-Rakestraw Co.

● HOUGHTON ADDITION

Opening of a five-story addition to the plant of E. F. Houghton & Co., oil, chemical and leather manufacturers, was announced at the annual stockholders' meeting of that company held at 303 W. Lehigh Avenue. The building was recently acquired from North Bros. Mfg. Co., and is located at N. American and Somerset Streets, opposite the Houghton main plant.

It will be used to house equipment for the manufacture of synthetic detergents and finishing materials for textile and other industries, and also for additional warehouse space.

At the election held during the meeting the following officers and directors were re-elected: Major A. E. Carpenter, President; G. W. Pressell, Executive Vice-President; Dr. R. H. Patch, Vice-President in Charge of Operations; D. J. Richards, Vice-President—Sales; E. A. Carpenter, Secretary; W. F. MacDonald, Treasurer; C. P. Stocke, Assistant Secretary, and Miss M. A. Healey, Assistant Treasurer. L. D. Holland, H. E. Sanson, H. B. Fox, C. H. Butler and W. A. Bohne were re-elected to the Board of Directors.

Provided unsettled conditions over the country are improved at an early date, good prospects for 1946 were predicted in the report of President A. E. Carpenter to the stockholders.

● RETURNS TO ATLAS COLOR

1st Lieut. David J. Collins has re-

turned to his home after 42 months in Service, including 30 months in the South Pacific, and is again associated with the Atlas Color & Chemical Co., 15 Wharf Street, Boston, Mass.

• RETURN TO QUAKER

Joseph N. Murphy, recently released from the Corps of Engineers with the rank of Captain, has returned to Quaker Chemical Products Corporation, Conshohocken, Pa., and has resumed his old position as a Process Engineer in the sale of the company's chemical specialties for the textile industry. Mr. Murphy will call on hosiery mills and other textile mills in Eastern Pennsylvania and Southern New Jersey.

During the war, Mr. Murphy saw service in the Mediterranean and the India-China-Burma Theaters as a Combat Engineer in military demolition work and later as a Staff Engineer on the staff of the General Purchasing Agent for China.

John R. Ellstrom, until recently a Lieutenant in the U. S. Naval Reserve, has also rejoined the Quaker organization and will serve in the Technical Service Division of the company. During the war, Mr. Ellstrom was in charge of a five inch battery on the heavy cruiser, "Quincy," and took part in the invasions of Normandy, Southern France and Okinawa and the occupation of the Japanese mainland.

• PHILADELPHIA QUARTZ APPOINTMENTS

Philadelphia Quartz Company, Philadelphia, manufacturers of Silicates of Soda and Metso Detergents, has announced the advancement of John C. Russell to Sales Manager. Mr. Russell has been associated with the Company since 1924, and was appointed Assistant Sales Manager in 1942. Mr. Russell is also Secretary and Director of an associate company, the American Doucil Company, manufacturers of synthetic zeolites.

Carl F. Wolcott has been named Manager of Foreign Sales and is also Employment Manager of the Company. Other appointments include Russell J. Emmons, Industrial Relations Manager and John H. Wills, Assistant Patent Manager.

• SELL KLAUDER-WELDON LINE

H. W. Butterworth & Sons Company of Philadelphia, announces that they have sold the Klauder-Weldon line of machinery to William E. H. Bell. Manufacture of this line of machinery which consists of Circulating Apron and Rotary type Skein, Scouring, Bleaching and Dyeing Machines will be discontinued by Butterworth.

Mr. Bell also will manufacture Raw Stock, Roll Dyeing, Bleaching and Washing Machines. These were all formerly made by the old Klauder-Weldon Company which Mr. Bell managed prior to the acquisition by H. W. Butterworth & Sons Company in 1926. Ever since that time, he has managed this division for Butterworth.

Merle S. Clark, who has been appointed St. Louis District Sales Manager of Mathieson Alkali Works. He will be in charge of the newly opened St. Louis branch office in the Paul Brown Building. Mr. Clark joined Mathieson in 1931. He was born in Indiana and completed his education at the University of Indiana. He taught chemistry and physics for several years before entering the industrial chemical field.

Mr. Bell's purchase includes all drawings, patterns, jiggs and fixtures, etc., necessary for the manufacture of these machines. Mr. Bell will be located at Adams Avenue and Leiper Street, Philadelphia, Pa.

• HOOKER ASSIGNMENT

The Hooker Electrochemical Company of Niagara Falls, N. Y., has recently assigned Neil M. Barber to its sales staff covering the territory comprising upper New York State and Northern Pennsylvania. His headquarters will be at Niagara Falls. A graduate of Dartmouth University, Mr. Barber has spent a number of years in the Niagara plant and more recently was engaged in Sales Development work.

• AUSTRALIAN TOUR

Dr. Frederick T. Peirce, director of research in the School of Textiles at N. C. State College, has recently returned from an extended tour of Australia, where he inspected and formulated scientific programs for wool production at the expense of the Australian Commonwealth Council for Scientific and Industrial Research.

• ANNUAL MEETING, T. C. C. A.

At the thirtieth annual business meeting of the Textile Color Card Association, the following directors were elected for the ensuing year:

Waldo Grose, Botany Worsted Mills; E. Irving Hanson, Hafner Associates, Inc.; Allan C. Jacobson, J. P. Stevens & Co.; Carl E. Kempf, Brewster Hat Co.; W. R. MacIntyre, Joseph Bancroft & Sons Co.; J. F. Marble, Waldrich Co.; William B. Olmsted, Jr., American Viscose Corp.; Brainerd Pidgeon, Stunzi Sons Silk Co.; Charles Pinnell, Merrimack Mfg. Co.; Armand Schwab, Armand Schwab & Co.; Roy E. Tilles, Gotham Hosiery Co., Inc.; John F. Warner, Riegel Development Laboratories, Inc.

All of the above directors were reelected, with the exception of Mr. Marble, who serves on the Board for the first time.

At a meeting of the directors held immediately after, the following officers were reelected:

President: Charles Pinnell (Merrimack Mfg. Co.)

1st Vice-Pres.: Roy E. Tilles (Gotham Hosiery Co., Inc.)

2nd Vice-Pres.: Armand Schwab (Armand Schwab & Co.)

Treasurer: Carl E. Kempf (Brewster Hat Co.)

Secretary and Managing Director: Margaret Hayden Rorke

A large increase in the organization's membership was reported for the fiscal year of 1944, the total number of new members for that period being 325. For the year 1945 to date, the Association has gained 317 new members, representing many different fashion and industrial classifications. Of special interest among these groups are the substantial number of firms in the men's wear industry, indicating a growing interest in color in this field. The cosmetic industry is also well represented in the Association's roster of new members. Many firms in the decorative trades are likewise included, such as, draperies and upholstery fabrics, carpets and other floor coverings, paint, varnish and lacquer, wall paper and plastics.

Especially notable is the large increase in foreign members who have joined the Association. Outside of the United States, the countries represented by the new members include England, Scotland, North Ireland, Canada, Australia, New Zealand, South Africa, France, Switzerland, Belgium, Holland, Egypt and Palestine. The Latin-American countries from which new members have been gained are Mexico, Brazil, Bolivia, Chile, Colombia, Peru and Cuba. The Association also has members in Argentina and Uruguay.

• BULLETIN ON GLAZED CHINTZ

The success of modern chemistry in producing durable glazes on chintz through the use of melamine formaldehyde resins has been announced in a bulletin published by the American Cyanamid Company's Textile Resin Department, Bound Brook, New Jersey.

Through the use of these resins it is

now possible to obtain high gloss glazes that will withstand even such severe treatment as boiling for a half hour in soapy water, according to American Cyanamid. These new melamine resin glazes are also said to be immune to dry cleaning processes. Another highly important effect claimed for the treatment with melamine resin finish is to control shrinkage, usually limiting shrinkage of resin finished chintz to less than 2 per cent in length or width. This means that the new chintzes will be completely washable without loss of characteristic glaze and without noticeable shrinkage.

The bulletin describes the development of the present high quality durable chintzes, including improvements in dyeing. Production steps are described with full details of the best modern methods of producing durable glazes, including preparation of the cloth, preparation of the finish batch, impregnation of the fabric, drying, pasting and friction calendering. Also discussed are the polymerizing, or curing, of the resins, the neutralization and washing of the cloth, drying, final calendering and inspection and testing. Properties of the various finishing resins and the chemical reactions that take place are described in some detail.

Textile Finishing Bulletin 101, "The Production of Durable Glazes on Chintz," may be obtained by request to the Textile Resin Department of the American Cyanamid Company, Bound Brook, New Jersey.

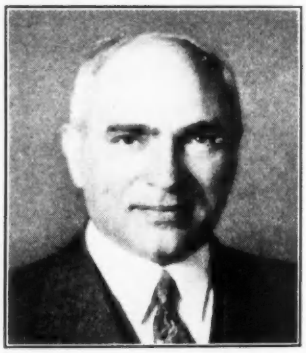
● NOPCO EXPANSION

Paving the way for a post-war plant expansion program during 1946 that will run to more than $1,000,000, a tract of waterfront property on the Passaic River adjacent to the present plant has just been acquired by the National Oil Products Co., chemical manufacturers, of Harrison, N.J., it was announced recently by Charles P. Gulick, president and chairman of the board.

The property, formerly owned by the United States Gypsum Co., comprises a 150-foot frontage on the river at the foot of Bergen St., and runs approximately 200 feet back to existing buildings of the Nopco plant.

Mr. Gulick stated that expansion plans already underway call for an expenditure of $900,000 to increase productive capacity at the plant. As a result of the land purchase, new expansion plans will be drawn up to further enlarge production facilities, research laboratories and administrative offices, he said.

"Acquisition of this new property makes it possible to go ahead with expansion plans which otherwise would have been impossible," Mr. Gulick stated.



Victor H. Berman, Chairman of the Board of Onyx Oil & Chemical Co., who has been elected President of the Processing Oils & Chemicals Association. He has been an officer and active member of the Association for many years.

Plans are underway for enlarging the scope of the work of the Association to broaden its value to the members. Membership includes many of the leading firms in the field.

"This tract 'squares out' our present property and gives us additional dock, rail and street frontage."

The National Oil Products Co. plant now comprises two full city blocks in Harrison, making it one of the largest plants in the New Jersey industrial center. The first building in Harrison was opened in 1907 on a small lot about 25 by 100 feet. The two-block area covered by the present plant now boasts a modern, five-story building, in addition to several smaller structures.

The company has other plants and offices at Richmond, Cal., Cedartown, Ga., Boston, Chicago, Portland and Seattle.

● BLUMENTHAL APPOINTMENT

Sidney Blumenthal & Co. Inc. announces the appointment of Lieutenant Commander Donald L. Herr, USNR, as manager of the Research and Control Division.

Before volunteering for active duty in 1940, Commander Herr was associated with the General Electric Co. in the development of various electronic computing and fire control devices, television and destroyer-drive circuit work, and was a special lecturer in G.E. on modern networks. He has also been associated in the past with the Bell Telephone Laboratories and the R.C.A. Mfg. Co.

Commander Herr is the author of numerous papers in his field, with special emphasis on electronics and physical methods of control. He is co-author, with Dean Harold Pender, Moore School of Electrical Engineering, University of Pennsylvania, on a pending two-volume text in modern network theory. He holds numerous patents and patent applications reflecting the broad scope of his past activities, especially in the fields of control and measurement, computing mechanisms and the newer applications of basic physics.

● JOINS PROVIDENCE TEXTILE

Raymond J. Morin for the past six years Supervisor of Textiles (woolens and worsteds) with the Boston Quartermaster Depot has joined the sales organization of the Providence Textile Chemical Company. Prior to his affiliation with the Quartermaster Depot, Mr. Morin was associated with the Rosemont Mill of Guerin Mills Inc. of Woonsocket, R.I., for 25 years, serving 12 years as assistant superintendent. Mr. Morin will devote his efforts toward the demonstration and sales of Protex products to the woolen and worsted manufacturers of New England.

● N. C. STATE APPOINTMENT

John F. Bogdan, former head of the yarn manufacturing departments of the Manville-Jenckes Corporation at Manville, R.I., has been appointed as applied research technologist and professor of textiles in the School of Textiles at N. C. State College. He was educated at the Lowell Textile Institute, Brown University, Rhode Island State College, and Boston University. His appointment was made possible through contributions of the North Carolina Textile Foundation.

● du PONT ADDITION

The du Pont Company announced that construction would start in the Spring on an addition to its Toledo, O., plant to provide Mid-West users of formaldehyde with a closer source of supply.

The new production unit of the Electrochemicals Department will be erected on the property of the Grasselli Chemicals Department plant at Stickney and Matzinger Roads, north of the city. It was estimated the new plant will cost $1,000,000.

● RETURNS TO AMERICAN VISCOSE

John H. Wilmerding, after nearly four years in the U. S. Navy, returned to the New York sales office of American Viscose Corporation on January 1 as manager of the acetate rayon sales division. Mr. Wilmerding held the rank of Lieutenant Commander at the time of his discharge. During the first years of the war he was on the destroyer *Buchanan*, which took an active part in the naval battles off Guadalcanal, and during the final stages of the attack against the Japanese mainland he was on the staff of Admiral William F. Halsey.

● PURCHASES TARTAR CHEMICAL

Stauffer Chemical Company, 420 Lex-

ington Ave., New York City, through its wholly-owned subsidiary, American Cream of Tartar Co., San Francisco, California, purchased on December 28 the Tartar Chemical Works, Brooklyn, N. Y., a subsidiary of Standard Brands.

The new Stauffer plant, which was taken over by the American Cream of Tartar on December 31, manufactures tartaric acid and cream of tartar.

Operations will continue with the same personnel and management, it was announced.

● HERCULES APPOINTMENTS

Frank G. Oswald has been appointed assistant sales director of the Synthetics Department of Hercules Powder Company, according to an announcement by Dr. W. M. Billing, general manager of the department. He will assist in general sales policies, sales training, and in coordination of technical sales activities.

The department is establishing a new group to handle the market development of new products, the announcement adds, with Malcolm C. Moore as manager, and J. Glenn Little as assistant manager. Others assigned to the group are Paul Johnstone and James Monkman.

Mr. Oswald has been manager of the Synthetics Department technical service division which is being discontinued in order to broaden sales activities of the department. He will continue to handle technical problems.

● NATIONAL STARCH APPOINTMENT

National Starch Products, Inc., announces the appointment of S. F. Thune as manager of their New England Division with headquarters at 15 Elkins Street, South Boston 27.

Mr. Thune joined National's organization 12 years ago, after graduating from Worcester Polytechnic Institute where he obtained his Bachelor of Science degree in Chemical Engineering. Having served four years as a technical service representative at their New York headquarters, he was transferred in 1938 to the Mid-western Division where he later became manager of Adhesives Sales.

● REJOINS BUTTERWORTH

Colonel Frederick N. Spoerl has returned to H. W. Butterworth & Sons Company, Philadelphia, Pa., after a leave of absence of over five years.

During this period, Colonel Spoerl has been stationed at Headquarters of the Signal Corps Engineering Laboratories, Bradley Beach, N. J., officiating in the capacity as Contracting Officer and Administrative Executive Officer.

Prior to his entrance into the Armed Forces, he was manager of the New England District for the Butterworth Company with offices in Providence, R. I.

He again will resume duties with the Company in a Sales-Engineering capacity, working from the Philadelphia, Pa., office.

● MATHIESON PAMPHLET

An eight-page illustrated pamphlet describing the steamer developed by The Mathieson Alkali Works for continuous open width processing of cotton and rayon fabrics is now available on request. The pamphlet discusses the construction and operation of the steamer, which is designed to eliminate both kier and jig scouring. It is stated that all widths of cloth may be prepared for conventional bleaching or dyeing in one alkaline steaming and that the steamer may also be used for any of the hot bleaching processes.

Copies of the pamphlet may be obtained from the company at 60 East 42nd Street, New York 17, N. Y.

● "FLEXOL" PLASTICIZER AVAILABLE

"Flexol" Plasticizer TOF (Trioctyl phosphate) a new and effective plasticizer, is now available in limited quantities from Carbide and Carbon Chemicals Corporation, a unit of Union Carbide and Carbon Corporation. Tank-car quantities will be obtainable later this year upon completion of a plant now under construction.

This versatile plasticizer is said to develop four important properties in plasticized compositions—excellent low-temperature flexibility, minimum change in flexibility over a wide temperature range, high resistance to water extraction, and low volatile loss. "Flexol" Plasticizer TOF is compatible with vinyl chloride, vinyl chloride-acetate and vinyl butyral resins, and the principal types of synthetic rubber. It is also compatible with ethyl cellulose and cellulose nitrate.

"Flexol" Plasticizer TOF is said to be useful in vinyl resin solution coatings as well as molded, calendered, or extruded compositions. It is especially effective in spreader and calender coatings for cloth where pliability and good drape are desired. Technical information on "Flexol" Plasticizer TOF may be obtained by writing Carbide and Carbon Chemicals Corporation, 30 East 42nd Street, New York 17, N. Y. and asking for Form 6159.

● REPORT ON DETERGENTS AND DYESTUFFS

German development of a valuable class of nonacid and nonalkaline detergents for synthetic fibers has been revealed through Allied investigation of the Oxo plant at Ruhrchemie, Oberhausen-Holten, Germany, the Office of the Publication Board said recently.

Detailed discussion of the production processes involved, together with a presentation of 30 formulas used by the I. G. Farbenindustrie plant at Ludwigshafen in producing dyestuffs for acetate rayon, and data on German production of various other chemicals, are contained in Report No. 4115, distributed by OPB at 25 cents per copy.

The report, entitled "Technical Report on the Manufacture of Miscellaneous Chemicals in Plants of the I. G. Farbenindustrie, A.G., Germany," was prepared by Ray H. Boundy and R. Leonard Hasche on behalf of the British Ministry of Miscellaneous Chemicals and the U. S. Technical Industrial Intelligence Committee.

● COTTON WEEK

Cotton Week this year is scheduled for May 20-25, according to an announcement by the Cotton-Textile Institute and National Cotton Council. "Cotton Is Back" has been chosen as the slogan for the event which will be marked not only by merchandise presentations in retail stores across the nation but also by cotton carnivals and community programs in many of the cotton growing and textile centers in the Southern States.

● ACQUIRES FRANKS CHEMICAL

The Witco Chemical Company announces acquisition of the Franks Chemical Products Company, Brooklyn, New York. No change will be made in the present management and Mr. Joseph M. Franks will continue as president. The company will be known as the Franks Chemical Products Company Division of Witco Chemical Company.

● SELL ROCHESTER PLANT

Amecco Chemicals, Inc., manufacturers of synthetic organic chemicals, announce that they have sold their Rochester, N. Y., plant. Manufacturing operations which were formerly carried out at this plant are being transferred to Dover, Ohio, and Henderson, Nevada, where production facilities will be greatly expanded. In the meantime, customers are being supplied from warehouse stocks.

The headquarters and sales offices of the company are located at 60 E. 42nd Street, New York 17, N. Y.

● REJOINS AMERICAN VISCOSE

John P. Dougherty has rejoined the American Viscose Corporation's textile research department as an assistant in the woolen and worsted divisions, following four years of service with the U. S. Army. The last three years of his service were spent at the Philadelphia Army Quartermaster Depot, where Mr. Doherty held the rank of 1st Lieutenant in the Research and Development Division and was officer in charge of laboratory inspection engaged in the testing of woolen and

worsted fabrics and raw wool. Prior to his military service Mr. Doherty was employed as assistant to Rene Bouvet, manager of the textile research department's research plant.

• DEVELOPS NYLON TINTS

The United States Testing Co., Inc. has recently developed a line of fugitive tints for use on nylon. The tinting of this fiber has always been a hazardous one due to the necessity of subjecting the yarn to high temperatures and steam pressures in the preboarding operation.

The testing company is now ready to offer a line of colors which, it is claimed, will successfully withstand the preboarding operation and still be fugitive in the scouring operation. The line consists of two types—water soluble and oil or solvent soluble.

The following seven colors are available in the Certified water soluble type. Nylon Red, Nylon Yellow, Nylon Blue, Nylon Orange, Nylon Green, Nylon Canary and Nylon Lavender.

The following four colors are available in the Nylol oil soluble type. Nylol Red, Nylol Yellow, Nylol Blue and Nylol Green.

• AWARDED LEGION OF MERIT

Five Quartermaster officers whose wartime assignments were with the Procurement Division, Office of The Quartermaster General, have been awarded the Legion of Merit for their services, which involved the solution of many of the problems arising in procurement of millions of articles of clothing, and equipage, vast yardages of textiles, and other military items. Presentation of the awards was made by Major General Clifford L. Corbin, acting for the Quartermaster General, who was director of procurement during the war.

The five are Colonel Vere Painter, Officer in Charge of the Quartermaster Field Inspection Service in New York; Lt. Colonel Joseph S. Oettinger, who served as chief of the Cost and Price Analysis Branch; Major Dwight L. Lawton, who organized and operated the Duck and Webbing Pool during the war; Major Rollin S. Bailey, former chief of the Equipment and General Supplies Section of the Office of the Quartermaster General's Procurement Division; and Captain Bruce M. Docherty of the legal branch, who acted as counsel for the textile and clothing branches of the Procurement Division.

• JOIN WHITEMARSH LABORATORY STAFF

Eight additional researchers have joined the staff of almost 100 at the Pennsylvania Salt Manufacturing Company's Whitemarsh Research Laboratories in the expanded post-war research program under Dr. S. C. Ogburn, Jr., Pennsalt's manager of Research and Development.

Dr. Ogburn said the staff additions would round out the research being done in textile chemicals, metal cleaners and related materials, ceramic chemicals and other developments in various Pennsalt products.

Among the new staff members is Dr. Martin Leatherman, a former Major in the Chemical Warfare Service Technical Command, who has a wide background in textile research, and will be in charge of development and evaluation of new and improved textile chemicals at Whitemarsh.

• RESIN PLANT UNDER CONSTRUCTION

Information now available as to the resin plant under construction in Wilmington, Delaware by National Atlantic Research Corporation, indicates that this plant will be operated by the Delaware Resin Chemicals Corporation which company was chartered recently. The directors of this company are Gordon Urquhart of Wynnewood, Pennsylvania, Anton Besterbreurtje of New York, F. C. Atwood of Newtonville, Massachusetts, and Edwin S. Dwelly of South Duxbury, Massachusetts.

At the meeting of the directors in Wilmington, Delaware, Gordon Urquhart was elected President, Mr. Besterbreurtje, Vice-President and Treasurer, Mr. Atwood Vice-President in charge of Development and E. S. Dwelly, Vice-President. Mr. Urquhart is also President of Wilmington Chemical Corporation and F. C. Atwood is President of National Atlantic Research Corporation. Mr. Besterbreurtje is Vice-President in charge of Production for Wilmington Chemical and active in many European matters. Mr. Dwelly is Executive Vice-President of National Atlantic Research Corporation.

The company headquarters for the present will be maintained in Wilmington, Delaware and all production and business transactions will be completed in that city. It is expected that shipments of finished products will start shortly.

• QUARTERMASTER DIRECTOR TRANSFERS

The transfer of Colonel Frank F. Taylor, Jr., Director of Procurement at the Jeffersonville Quartermaster Depot through most of World War II, to the Philadelphia Quartermaster Depot, was announced recently by Colonel H. S. Evans, Acting Commanding Officer at Jeffersonville.

• REJOINS BORNE-SCRYMSER

Borne - Scrymser Company, Elizabeth, New Jersey announces the return of Ralph G. Benson after three years naval service. Mr. Benson will resume his former duties as Industrial Lubrication Engineer in the New England area.

• CHROMIUM PLATING EQUIPMENT

Walton and Lonsbury, 78 North Avenue, Attleboro, Mass., operators of a complete industrial hard chromium plating service, have recently announced the early installation of special equipment for vertical plating of rolls. This unit will be of new design especially for the vertical plating of copper print rolls and other similar parts. It will include complete handling equipment.

Already installed at Walton and Lonsbury is a complete machine shop for manufacturing the racks and fixtures so vital to successful hard chromium plating. Customary and special-purpose flexible grinding, polishing and buffing equipment ranges from small hand grinders to special equipment capable of handling rolls up to 20 feet in length and 36 inches diameter.

Textile metallic parts which are frequently hard chromium plated by Walton and Lonsbury include: formed wire thread guides, gate tensions and tension discs, printing, drying and calendering rolls, carrier rolls, bars, dye poles, leash rods, needles, reeds, combs, etc.

• JOINS DuPONT

Miss Beth Peterson, for the past ten years State extension specialist in textiles and clothing at Iowa State College, Ames, has been appointed home economics consultant in the Extension Division, Public Relations Department of the Du Pont Company.

Miss Peterson will edit the company's publication "Chemistry and the Home," and will give lecture-demonstrations on that subject throughout the United States.

OBITUARY

ROSCOE L. CHASE

ROSCOE L. CHASE, retired textile chemist and former instructor in textile chemistry, died January 16th at his home in Providence. He was 86 years old.

He was born in Lowell, Mass., graduated from the Massachusetts Institute of Technology, taught chemistry for a few years at Philadelphia Textile School, and later was for many years manager of the Arnold Print Works at North Adams, Mass. He retired in 1917, moving to California, but later during the war returned East and became manager of the U. S. Finishing Company plant in Pawtucket, R. I. He was for a time New York representative of the Apponaug Finishing Co. He had lived in Providence since about 1918.

Mr. Chase is survived by his wife, a daughter, a brother, Harold M. Chase of Riverside & Dan River Cotton Mills, Inc., and two grandchildren.

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The success of this clever round-the-clock suit depends greatly upon its color striking the fancy of the women who see it as they shop.

All parties concerned can have confidence in the success of this suit, due among other things to the fact that the Bell Company, the weaver, counts Sandoz among its suppliers and relies upon Sandoz for top quality in dyes.

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For example — Sandoz offers a full range of Acid colors . . . level dyeing, well suited for piece dyeing, and extremely fast to light and wear. These include Xylene Light Yellow 2GP (Pat.) . . . patented Alizarine Light Blue 4GL and Violet 2RC or Azo Rubinole 3GP (Pat.) . . . exclusive Sandoz developments.

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The Eppley Pyrheliometer, used in conjunction with the correct potentiometric recorder, gives you this information, furnishing a complete, accurate and reliable record of the amount of solar radiation received each day at any particular spot. It is for obtaining such records that the EPLAB PYRHELIOMETER is used at fourteen out of eighteen weather stations in the United States, nine of which stations are under the direction of the United States Weather Bureau.

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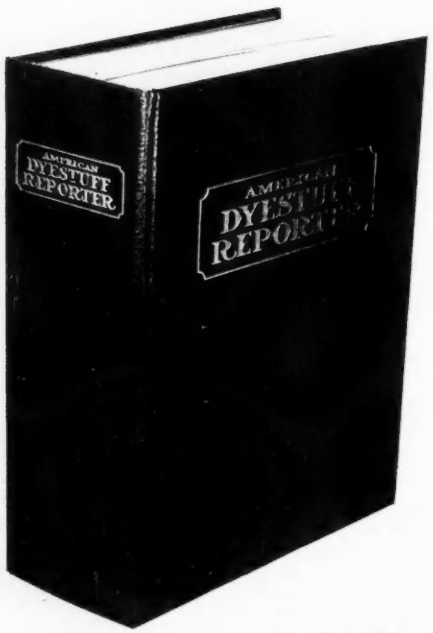

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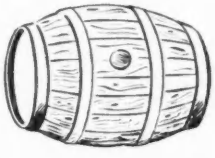

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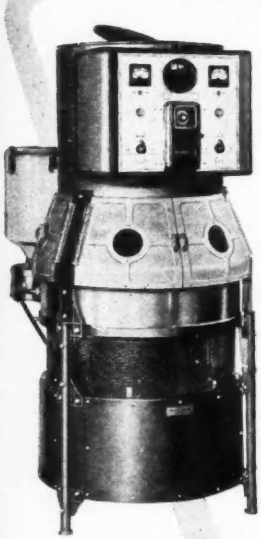

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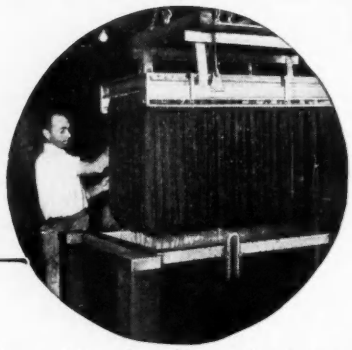

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SODIUM NITRITE

IN THE PREPARATION OF AZO dyes of any color of blue for cotton, rayon or silk, SOLVAY Sodium Nitrite gives you the best possible results . . . and color fastness at minimum cost. Of U.S.P. Grade, this fine crystal tends to remain free-flowing. Its high quality and purity were expressly developed for the making of azo dyes and for fine textile dyeing.

For color-right quality dyes, specify SOLVAY Sodium Nitrite.

SOLVAY SALES CORPORATION
Alkalies and Chemical Products Manufactured by The Solvay Process Company
40 Rector Street New York 6, N. Y.
BRANCH SALES OFFICES:
Boston • Charlotte • Chicago • Cincinnati
Cleveland • Detroit • New Orleans • New York
Philadelphia • Pittsburgh • St. Louis • Syracuse

• CLASSIFIED ADVERTISEMENTS •

CONFIDENTIAL EMPLOYMENT SERVICE — We invite correspondence (confidential) with Dyers, Chemists, Colorists, Superintendents, Master Mechanics, Office Managers, and others seeking positions and with employers seeking high-grade men to fill vacancies or to make replacements. Charles P. Raymond Service, Inc., 294 Washington St., Boston, Mass. Over forty-five years in business.

WANTED: TECHNICAL SALES ASSISTANT to become permanently connected with nationally recognized manufacturer of textile processing specialties. Prefer graduate of textile institute with mill experience. Will act as assistant to district manager covering Minnesota, Wisconsin, Iowa, Illinois, Indiana and Ohio. Salary plus bonus. Write giving complete educational and business background. Replies held in strict confidence. Our organization knows of this advertisement. Write Box 820.

Dyestuff Manufacturer has openings for technically trained salesmen in North-South Carolina, Pennsylvania, New Jersey and New York. Please give complete details regarding background and salary desired to start. Box 830.

WANTED: TEXTILE CHEMIST who combines practical knowledge and "know how" to introduce and demonstrate ultra modern textile specialties to finishing plants in this country and South America. Unusual opportunity for right man. State complete background in first letter. Box 831.

POSITION WANTED: Finisher, experienced, wishes to make change to a mill in the Metropolitan New York area. Thoroughly familiar with all kinds of cloths. Can furnish excellent references. At present, a Finisher in one of the foremost dyeing and finishing establishments in the industry. Would welcome opportunity with firm that handles both plain dye and machine and screen printing, as finisher or supervisor of finishing. Box 835.

POSITION WANTED: Finisher, 15 years experience, 33 years old. Piece goods, Spun and Mixtures, Rayon Crepes, Satins, Wool and Aralac, Acetates. New York Textile School graduate. Some dyeing experience. Veteran, recently discharged. Box 834.

WANTED: Chemist for laboratory of large textile dyeing plant. Must be familiar with all phases of synthetic textile dyeing and finishing procedure. State experience and references in reply. Box 832.

POSITION WANTED: Garment Dyer looking for a permanent job as a sample dyer in a wholesale dyeing plant. References can be furnished. Box 833.

POSITION WANTED: Textile chemist, graduate of Philadelphia Textile Institute. Will consider either production or technical sales. Served 3½ years Army Air Forces. 24 years old, married, no children; references. Box 836.

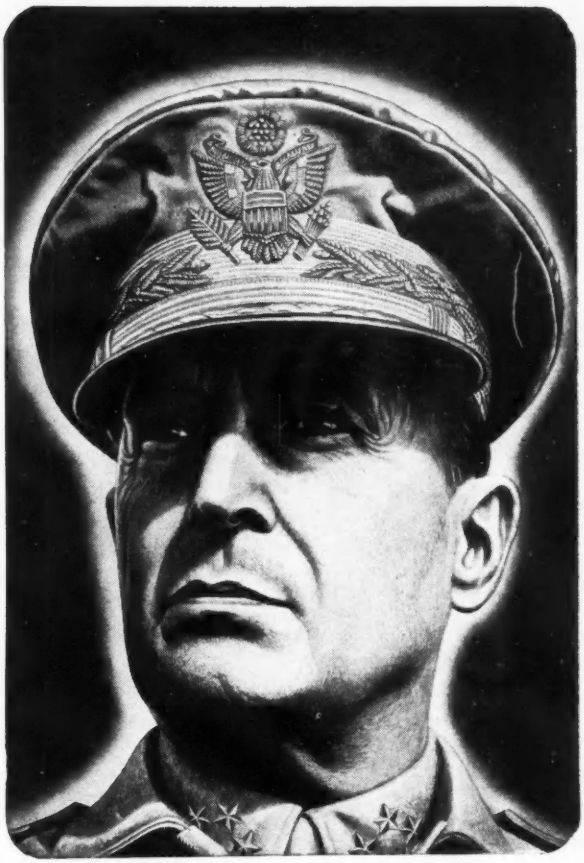
WANTED: Small progressive manufacturer of complete line of textile specialties looking for experienced salesmen and agents. Various territories open, profit sharing basis. Box 837.

POSITION WANTED: To act as Austrian representative of progressive, forward-looking American spinning mill or dye company. Am textile engineer with best connections all leading manufacturers. Address Wilhelm Neumann v. Spallart Tex. Ing. Wien VIII. Langegasse 74, Austria.

POSITION AVAILABLE for college graduate with chemical degree, familiar with textile processes and utilization of textile treating agents. In reply please provide complete details concerning education, experience, personal data, salary desired, and recent photograph. Those not qualified, please do not apply.

Director of Industrial Relations
Emery Industries, Inc.,
4206 Carew Tower,
Cincinnati 2, Ohio.

You can take General MacArthur's word for it!



"The Red Cross has done a 100 per cent job in this theatre. Mathematical limitations alone prevent my saying the Red Cross services here have been more than 100 per cent."

—General Douglas MacArthur

SO SPEAKS a distinguished eye-witness of your Red Cross in action. General MacArthur *saw* the Red Cross at your fighting man's side, all through the gruelling months of the Pacific campaign. He saw Red Cross men under fire on D-Day beachheads—sweat it out in foxholes—follow the men with candy, cigarettes and other comforts right up to the firing line.

He knows that wherever your fighting man went, your Red Cross went, too—that wherever, whenever he needed respite and recreation, help with a personal problem, or just someone to talk to, the Red Cross was there.

He also knows, as you do, that your Red Cross cannot yet say, "Mission accomplished." It still has an enormous task to do. With your help, it will carry this task to a successful completion.

The War is over . . .
but another battle has begun

Your Red Cross must now fight on three new battlefronts. The thousands of our men still in veterans' hospitals and in faraway lands overseas need its comfort and cheer now, as they did when the bombs were bursting. And as our servicemen return to civilian life, your Red Cross must lend them a helping hand.

And when disaster strikes here at home—fire, flood, tornado—your Red Cross must be ready with aid for the victims. Its war against human misery is never wholly won.

But remember—it is *your* Red Cross. It depends on you for its very existence. So give from your heart. Give generously. Give *today!*

YOUR Red Cross MUST CARRY ON . . . *GIVE!*

10 PRODUCTS of Proven Dependability

WHICH SHOULD WARRANT ★ YOUR ATTENTION ★

***AQUAROL :** A water repellent for processing woolen, cotton and rayon fabrics, also produces excellent results in splashproofing or finishing all types of hosiery.

***PARAMINE S :** A cation active softener for processing cotton and rayon cloth to obtain a soft, smooth, pleasing finish.

***ALGEPON S :** An assistant in dyeing vat colors to prevent premature oxidation of the reduced bath and eliminate uneven dyeings.

***ALGEPON V A :** Assistant for stripping vat colors—complete reduction of color in stripping bath providing lighter bottom for redyeing.

***PARAPON S A :** A highly efficient leveler and softener for dyeing and finishing all types of yarn, cloth and hosiery to produce a uniform dyeing and a soft full hand.

***ARIPEL F S :** Finish and gas inhibitor for processing dyed acetate rayon—produces a soft full feeling finish and prevents gas fading of the color.

***LANITOL F :** A synthetic detergent possessing exceptional scouring and washing properties for processing wool, cotton, rayon or nylon.

***CULOFIX :** Used as an after treatment in last rinse to prevent bleeding of direct dyed cotton or rayon in water.

***DIAZONOL A C :** For boiling out cotton cloth in pressure or open kiers to produce greater absorbency and cleaner material. Excellent for preboiling knitted cloth in preparation for chlorine bleach. Also used with good results for boiling out cotton or rayon cloth on the jig.

***TETRANOL 1638 :** A rapid wetting and penetrating agent. Active in acid, alkaline and salt solutions and not affected by hard water, may be used in all types of dyeing operations to insure positive penetration of color and a uniform and solid shade.

And a Complete Line of Oils, Chemicals, Softeners and Finishes For Wet Processing All Textile Fibres

*Reg. U.S. Pat. Off.

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Newark, New Jersey

ESTABLISHED OVER 40 YEARS

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